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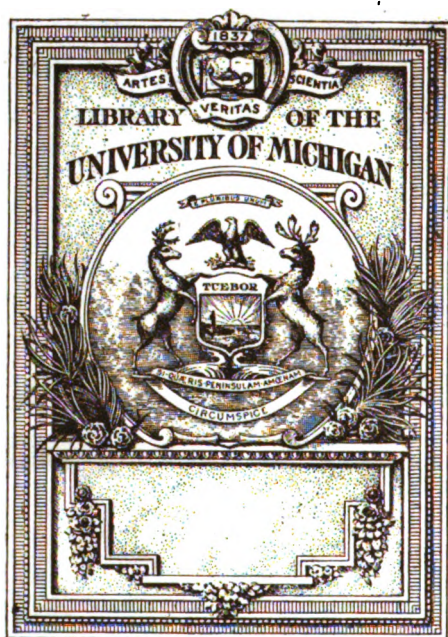
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THE  
**NAUTICAL ALMANAC**  
AND  
**ASTRONOMICAL EPHEMERIS**

FOR THE YEAR

1870;

WITH AN APPENDIX,

CONTAINING ELEMENTS AND EPHEMERIDES

OF

CERES, PALLAS, JUNO, VESTA, AND ASTRÆA;

FOR THE YEARS

1867, 1868, 1869, AND 1870.

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PUBLISHED BY ORDER OF  
THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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the small, the Page of the Preface ; and the Arabic, the Page of the Book.*

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# P R E F A C E.

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THE contents and arrangement of the NAUTICAL ALMANAC AND ASTRONOMICAL EPHEMERIS for the year 1870 are the same generally as those of the preceding year; the only addition is an Appendix containing Elements and Ephemerides of Ceres, Pallas, Juno, Vesta, and Astræa, for the years 1867, 1868, 1869, and 1870.

The places of the Sun are from LEVERRIER's Tables in "*Annales de l'Observatoire Impérial de Paris*," Vol. IV.

The Nutations of the Obliquity of the Ecliptic ( $\Delta \omega$ ) and of Longitude ( $\Delta L$ ), have been computed according to the following formulæ :

$$\begin{aligned}\Delta \omega &= 9'' \cdot 2237 \cos \Omega - 0'' \cdot 0896 \cos 2 \Omega + 0'' \cdot 5507 \cos 2 \odot \\ \Delta L &= -17'' \cdot 2526 \sin \Omega + 0'' \cdot 2073 \sin 2 \Omega - 1'' \cdot 2693 \sin 2 \odot\end{aligned}$$

where  $\Omega$  is the mean Longitude of the Moon's ascending Node, and  $\odot$  the true Longitude of the Sun. The coefficients are those of Professor PETERS.

The mean Obliquity of the Ecliptic has been taken  $= 23^{\circ} 27' 22'' \cdot 31$ , on January 1, 1870, and the mean annual diminution  $= 0'' \cdot 476$ . (LEVERRIER's Solar Tables, page 203.)

The Semidiameter of the Sun at the Earth's mean Distance  $= 16' 1'' \cdot 32$ , being the result of the 12 years' Observations, 1836 to 1847, made at the Royal Observatory, at Greenwich.

The Equatorial Horizontal Parallax of the Sun, at the Earth's mean Distance, has been taken  $= 8'' \cdot 95$ . (LEVERRIER's Solar Tables, page 114.)

The Constant of Aberration  $= 20'' \cdot 4451$ . (*Struve, Sur le Coefficient Constant de l'Aberration*, p. 47.)



The Sidereal Time at Mean Noon =  $\frac{\text{Sun's mean Longitude}}{15} + \text{Nutation in R.A.}$   
(in time); the Sun's mean Longitude for the Paris Mean Time  $0^h 9^m 20^s \cdot 63$ , or Greenwich Mean Noon of any day in the nineteenth century, is supplied by LEVERRIER's Tables I, III, IV., and V.

The Sun's Geocentric Co-ordinates from the true equinox of the date, and their reductions to the mean equinox of January 1, have been computed from the following formulæ :

$$\begin{aligned} X &= R \cos \odot \\ Y &= R \sin \odot \cos \omega - \lambda \sin \omega \sin 1'' \\ Z &= R \sin \odot \sin \omega + \lambda \cos \omega \sin 1'' \\ X' - X &= Y \Delta \odot \sec \omega \sin 1'' \\ Y' - Y &= -X \Delta \odot \cos \omega \sin 1'' + Z \Delta \omega \sin 1'' \\ Z' - Z &= -X \Delta \odot \sin \omega \sin 1'' - Y \Delta \omega \sin 1'' \end{aligned}$$

in which  $R$  represents the Radius Vector of the Earth,  $\odot$  the Sun's *true* Longitude from the *true* equinox,  $\omega$  the apparent Obliquity of the Ecliptic,  $\lambda$  the Sun's Latitude,  $\Delta \odot$  the precession in longitude from January 1,  $+$  the nutation, and  $\Delta \omega$  the nutation in Obliquity. The formulæ for computing  $X' - X$ , &c. are sufficiently approximate, and are convenient for the construction of small tables; their use will seldom involve an error of so much as '0000002.

The Longitude, Latitude, Horizontal Parallax, Semidiameter, Right Ascension, and Declination of the Moon at noon and midnight, have been deduced from HANSEN's Tables.\*

The Right Ascension and Declination have been examined by means of differences to the fourth order, and interpolated for every hour. From these have been deduced the Right Ascension and Declination at transit on each day of the year.

The Lunar Distances from the Sun have been computed from Longitude and Latitude for every six hours, examined by means of differences to the second order, and interpolated for every three hours. Those from the Planets and Stars have been computed from Right Ascension and Declination for every six hours, examined by means of differences to the second, third, and sometimes fourth order, according to the irregularity of their variation, and interpolated for every three hours.

The places of Mercury, Venus, and Mars, have been deduced from LEVERRIER's Tables in "*Annales de l'Observatoire Impérial de Paris*," Vols. V. and VI.

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\* Tables de la Lune, construites d'après le principe Newtonien de la gravitation universelle, par P. A. HANSEN, Directeur de l'Observatoire Ducal de Gotha. London, 1857. 4to.



and those of Jupiter, Saturn, and Uranus, from BOUVARD's new Tables,\* substituting only for Table XLII. of Saturn, Professor ADAMS's correct Table given in the NAUTICAL ALMANAC for 1851, page xiv. The places of Neptune are from KOWALSKI's Tables.†

For Mercury, the Perturbations were obtained from the Tables for each fifth mean noon, and interpolated with second differences; the remainder of the calculations was performed independently for every mean noon.

For Venus, the Heliocentric Longitude, Latitude and Radius Vector, were computed for mean noon of every eighth day, and interpolated with fourth differences for each day. The Geocentric places were computed for every second day, and interpolated with second differences for each day.

For Mars, the Heliocentric Longitude, Latitude and Radius Vector, were computed for mean noon of every twelfth day, and interpolated with fourth differences for each day. The Geocentric places were computed for every second day, and interpolated with second differences for each day.

For Jupiter, Saturn, and Uranus, the Heliocentric Longitude, Latitude and Radius Vector, were computed for mean noon at intervals of thirty days, and interpolated, for each day, with second differences. The Geocentric places of Jupiter and Saturn were obtained independently for every sixth day, and interpolated for each day, with fourth differences; those of Uranus for every eighth day, and interpolated for each fourth day.

For Neptune, the Heliocentric Places were computed at intervals of thirty-two days, and Geocentric ones at intervals of eight days, and interpolated with second differences.

The Semidiameters of the Planets, at the mean distance of the Earth from the Sun, have been adopted as follow:

Mercury,	Eq. Sem.	3 <sup>h</sup> 34	(Leverrier's <i>Tables of Mercury</i> , page 182).
Venus,	Eq. Sem.	8 <sup>h</sup> 305	(Leverrier's <i>Tables of Venus</i> , page 168).
Mars,	Eq. Sem.	5 <sup>h</sup> 55	(Leverrier's <i>Tables of Mars</i> , page 412).
Jupiter,	Eq. Sem.	99 <sup>h</sup> 704	( <i>Mem. Ast. Soc.</i> , vol. iii. page 301).
Saturn,	Eq. Sem.	81 <sup>h</sup> 106	( <i>Ast. Nach.</i> No. 189).
Uranus,	Eq. Sem.	37 <sup>h</sup> 25	(Delambre's <i>Astronomy</i> , vol. ii. page 620).

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\* Tables Astronomiques publiées par le Bureau des Longitudes de France, contenant les Tables de Jupiter, de Saturne et d'Uranus, construites d'après la Théorie de la Mécanique Céleste: par M. A. BOUVARD. Paris, 1821. 4to.

† Recherches sur les Mouvements de Neptune, suivies des Tables de cette Planète, par M. KOWALSKI. Kasan, 1855. 8vo.



For Jupiter and Saturn, Polar Sem. = Eq. Sem.  $\times$  927.

The Eclipses of Jupiter's Satellites have been computed from "*Tables Ecliptiques des Satellites de Jupiter, d'après la théorie de leurs attractions mutuelles et les constantes déduites des Observations.* Par le Baron DE DAMOISEAU. Publiées par le Bureau des Longitudes. Paris 1836," using  $9^m 20^s.6$  for the difference of meridians.

For the first Satellite, equations 4 and 5 have been taken from the Tables for every Eclipse, and the other equations for each sixth Eclipse. For the second Satellite, equation 4 has been taken for every Eclipse, and the others for each fourth Eclipse. For the third Satellite, equation 5 has been taken for every Eclipse, and the others for each second Eclipse. For the fourth Satellite, the whole of the equations have been taken from the Tables for each Eclipse. In each case the computation has been finished by interpolating, with second differences, the sums of those equations not taken from the Tables for each Eclipse.

For the Configurations and Occultations of the Satellites, as well as the Transits of the Satellites and their Shadows over the disc of the Planet, WOOLHOUSE'S Tables in the APPENDIX to the NAUTICAL ALMANAC for 1835 have been used, with the exception of Table II. of each Satellite, which has been reconstructed to adapt it to DAMOISEAU'S New Tables.

The Elements at page 491, for determining the appearance of Saturn's Ring, have been calculated as for the NAUTICAL ALMANACS 1860-1865; the formulæ, &c. will be found in the Prefaces to those volumes.

The Mean Places for January 0<sup>d</sup>.048, 1870, of 84 of the 100 Fixed Stars formerly given, have been derived from a manuscript by Professor ADAMS, and the remaining 16 from the fundamental Catalogue for 1840, contained in the NAUTICAL ALMANAC for 1848, pages 436 to 441, by means of the formulæ at page xiv of the PREFACE to the *Second Edition* of the NAUTICAL ALMANAC for 1834. Of the 47 stars inserted for the first time in the NAUTICAL ALMANAC for 1857, the mean places of 43 have been derived from the Greenwich Observations of 1850 as printed, and the Observations of 1851 and 1852 as supplied in manuscript by the ASTRONOMER ROYAL. The positions of  $\nu$  Orionis,  $h$  Sagittarii,  $\rho$  Capricorni, and  $\gamma$  Virginis have been taken from the Greenwich Twelve-year Catalogue\*—the place for 1840 alone having been adopted for the latter star. The proper motions as determined by the REV. R. MAIN, in his paper on the subject, (*Mem. Roy. Ast. Soc. Vol. xix.*) or computed by similar formulæ, have

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\* Catalogue of 2156 Stars, formed from the Observations made during twelve years, from 1836 to 1847, at the Royal Observatory, Greenwich. London. 1849. 4to.



been included in the reductions of the mean places of the 47 additional stars to the year 1870.

The Logarithms of E, F, G, H, and the value of L, at page XIX, of each month, have been computed from the Logarithms of A, B, C, D, in page XX, by the formulæ in the introduction to the Greenwich Twelve-year Catalogue.

The Logarithms of A, B, C, D, at page XX, of each Month, have been computed agreeably to the formulæ at page 329, omitting only in the values of C and D the terms —  $0.00405 \sin 2 \zeta$  (and —  $0.0885 \cos 2 \zeta$  ; and for the only Stars that can be sensibly affected by the omission, viz., the five Polar Stars, a Table of Corrections is given at pages 388 and 389.

The Table of Constants at pages 330 and 331 for facilitating the Reduction of Stars *generally*, has been computed from BESSEL's formulæ, given at page 329, using the A, B, C, D, contained in this volume.

The apparent places of 142 of the Fixed Stars have been deduced from the mean places for January  $0 + 0^d.048$ , 1870, using the Variables A, B, C, D, in the present Volume with Constants computed for the year 1870, similar to those for 1850 in the Catalogue of the British Association.\* For the five Polar Stars the constants have been computed for 1870 and 1871, and interpolated. The corrections were computed independently for every tenth day, with the exception of those for  $\alpha$  and  $\delta$  URSE MINORIS, which were interpolated, with second differences, from computations made for every third day of the year.

A further correction of the right ascension for *daily* aberration is necessary, where extreme accuracy is required, and may be computed as follows : Let  $\phi$  denote the latitude of the place, and  $\delta$  the declination of the Star, then the correction (*in time*) for the *upper* transit is,

$$+ 0^s.0206 \cos \phi \sec \delta$$

and for the *lower* transit,

$$- 0^s.0206 \cos \phi \sec \delta$$

The Lists of Moon-Culminating Stars, and Stars liable to Occultation by the Moon, have been selected from the Catalogue of the British Association.

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\* The Catalogue of Stars of the British Association for the Advancement of Science; containing the Mean Right Ascensions and North Polar Distances of eight thousand three hundred and seventy-seven Fixed Stars, reduced to January 1, 1850: together with their annual precessions, secular variations, and proper motions, as well as the logarithmic constants for computing precession, aberration, and nutation. With a Preface explanatory of their Construction and Application. By the late Francis Bailey, Esq. London, 1845. 4to.



The mean places of the Stars for each List were taken in order of preference,  
 1. From the Catalogue of the 147 Stars in this Work. 2. From AIRY'S Greenwich Six-Year, Twelve-Year, and Seven-Year Catalogues of Stars. 3. From the Catalogue of the British Association. The reduction of the mean to the apparent places has been performed by means of the Constants in the Catalogue of the British Association; the corrections for each star on the contiguous days being obtained by different computers for the Moon-Culminating List, and those for the Occultations by duplicate computations.

The calculations of the Solar Eclipses, the Elements of Occultations, and the Occultations visible at Greenwich, have been made according to the methods and formulæ given by Mr. WOOLHOUSE in the APPENDIX to the NAUTICAL ALMANAC for 1836: those relating to the Occultations wholly, and to the Eclipses partly, in duplicate.

The positions of the Moon's Equator at page 493, used in computing the Moon's Libration, have been calculated as for the NAUTICAL ALMANACS 1867-1869; the formulæ will be found in the Prefaces to those volumes.

The Tides at London Bridge for the year 1870 have been computed from tables in "An Elementary Treatise on the Tides. By J. W. LUBBOCK, Esq." (London, 1839.)

The Tables for finding the Latitude of a place by Observations of the Pole Star ( $\alpha$  URSE MINORIS), at any hour of the day, are founded on the following formula:

$$l = a - p \cos h + \frac{1}{2} \sin 1'' (p \sin h)^2 \tan a$$

where  $l$  denotes the latitude

$a$  — the true altitude of the Star

$p$  — the apparent polar distance, expressed in seconds of arc

$h$  — the hour angle of the Star =  $S - \alpha$ ;  $S$  being the sidereal time of observation, and  $\alpha$  the right ascension of the Star.

Table I. contains the value of the *second* term ( $p \cos h$ ) or the *first correction*, assuming, as *mean* values,  $p = 83' 0''$ , and  $\alpha = 17^\circ 45'$ .

Table II. contains the value of the *third* term ( $\frac{1}{2} \sin 1'' (p \sin h)^2 \tan a$ ) or the *second correction*, using the same *mean* quantities as in Table I.

Table III., which is *special* for the year 1870, and depends upon the difference between the true and assumed values of  $p$  and  $\alpha$ , contains the *third* correction increased by  $1'$  for the purpose of rendering the quantities additive.

A fourth term ( $-\frac{1}{2} \sin^2 1'' (p \cos h) (p \sin h)^2$ ) is omitted, its greatest value being less than half a second.



## PREFACE.

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In the construction of this Ephemeris generally, duplicate computations have been made where necessary, and isolated calculations performed to guard against systematic error; all results admitting of such test have been finally examined by means of differences, and every precaution taken to secure accuracy in the printing.

J. R. HIND,  
Superintendent.

*Nautical Almanac Office,  
3, Verulam Buildings, Gray's Inn, London.  
October 2, 1866.*

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## PRINCIPAL ARTICLES OF THE CALENDAR, For the Year 1870.

Golden Number - - - - -	9		Dominical Letter - - - - -	B
Epact - - - - -	28		Roman Indiction - - - - -	13
Solar Cycle - - - - -	3		Julian Period - - - - -	6583

## FIXED AND MOVEABLE FESTIVALS, ANNIVERSARIES, &c. &c.

Epiphany - - - - -	Jan. 6		Birth of Q. Victoria - - -	May 24
<i>Septuagesima Sunday</i> - - -	Feb. 13		<i>Ascension Day—Holy Thursday</i> -	26
<i>Quinquagesima—Shrove Sunday</i> -	27		<i>Pentecost—Whit Sunday</i> -	June 5
St. David - - - - -	Mar. 1		<i>Trinity Sunday</i> - - - - -	12
<i>Ash Wednesday</i> - - - - -	2		<i>Corpus Christi</i> - - - - -	16
<i>Quadragesima—1st Sun. in Lent</i> -	6		Accession of Q. Victoria - - -	20
St. Patrick - - - - -	17		Proclamation - - - - -	21
Annunciation—Lady Day - - -	25		St. John Bapt.—Midsum. Day - -	24
<i>Palm Sunday</i> - - - - -	April 10		St. Michael—Michaelmas Day Sept.	29
<i>Good Friday</i> - - - - -	15		Birth of Prince of Wales - -	Nov. 9
<b>EASTER SUNDAY</b> - - - - -	17		<i>1st Sunday in Advent</i> - - - -	27
St. George - - - - -	23		St. Andrew - - - - -	30
<i>Low Sunday</i> - - - - -	24		St. Thomas - - - - -	Dec. 21
<i>Rogation Sunday</i> - - - - -	May 22		Christmas Day - - - - -	25

The Year 5631 of the Jewish Era commences on September 26, 1870.

Ramadân (Month of Abstinence observed by the Turks) commences on  
November 25, 1870.

The Year 1287 of the Mohammedan Era commences on April 3, 1870.



# EXPLANATION OF ASTRONOMICAL SYMBOLS AND ABBREVIATIONS.

☉ The Sun.	♂ Euphrosyne.	♄ Asia.
☾ The Moon.	♀ Pomona.	♄ Leto.
☿ Mercury.	♂ Polyhymnia.	♄ Hesperia.
♀ Venus.	♂ Circe.	♄ Panopea.
♂ or ♀ The Earth.	♂ Leucothea.	♄ Niobe.
♂ Mars.	♂ Atalanta.	♄ Feronia.
♂ Ceres.	♂ Fides.	♄ Clytie.
♂ Pallas.	♂ Leda.	♄ Galatea.
♂ Juno.	♂ Lætitia.	♄ Eurydice.
♂ Vesta.	♂ Harmonia.	♄ Freia.
♂ Astræa.	♂ Daphne.	♄ Frigga.
♂ Hebe.	♂ Isis.	♄ Diana.
♂ Iris.	♂ Ariadne.	♄ Eurynome.
♂ Flora.	♂ Nysa.	♄ Sappho.
♂ Metis.	♂ Eugenia.	♄ Terpsichore.
♂ Hygeia.	♂ Hestia.	♄ Alcmena.
♂ Parthenope.	♂ Aglaia.	♄ Clio.
♂ Victoria.	♂ Doris.	♄ Io.
♂ Egeria.	♂ Pales.	♄ Semele.
♂ Irene.	♂ Virginia.	♄ Sylvia.
♂ Eunomia.	♂ Nemausa.	♄ Thisbe.
♂ Psyche.	♂ Europa.	♄
♂ Thetis.	♂ Calypso.	♄
♂ Melpomene.	♂ Alexandra.	♄
♂ Fortuna.	♂ Pandora.	♄ Jupiter.
♂ Massilia.	♂ Melete.	♄ Saturn.
♂ Lutetia.	♂ Mnemosyne.	♄ Uranus.
♂ Calliope.	♂ Concordia.	♄ Neptune.
♂ Thalia.	♂ Olympia.	♄ Conjunction.
♂ Themis.	♂ Echo.	☐ Quadrature.
♂ Phœbea.	♂ Danaë.	♄ Opposition.
♂ Proserpine.	♂ Erato.	♄ Ascending Node.
♂ Euterpe.	♂ Ansonia.	♄ Descending Node.
♂ Bellona.	♂ Angelina.	N. North. S. South.
♂ Amphitrite.	♂ Maximiliana.	E. East. W. West.
♂ Urania.	♂ Maia.	



# EXPLANATION OF ASTRONOMICAL SYMBOLS AND ABBREVIATIONS —continued.

° Degrees.	♈ Aries - - °	♎ Libra - - 180°
' Minutes of Arc.	♉ Taurus - - 30	♏ Scorpio - 210
" Seconds of Arc.	♊ Gemini - 60	♐ Sagittarius 240
h Hours.	♋ Cancer - 90	♑ Capricornus 270
m Minutes of Time.	♌ Leo - - 120	♒ Aquarius - 300
s Seconds of Time.	♍ Virgo - - 150	♓ Pisces - - 330

## LAW TERMS, 1870.

As settled by Statutes

11 GEO. IV. and 1 WILL. IV. cap. 70, s. 6. (Passed July 23, 1830.)

1 WILL. IV. - - - - - cap. 3, s. 2. (Passed Dec. 23, 1830.)

HILARY TERM - - - - Begins Jan. 11 - - Ends Jan. 31

EASTER - - - - - Apr. 15 - - - May 12

TRINITY - - - - - May 26 - - - June 16

MICHAELMAS - - - - - Nov. 2 - - - Nov. 25

For Returns see Statute 1 WILL. IV. cap. 3, s. 2. (Passed Dec. 23, 1830.)

## UNIVERSITY TERMS, 1870.

Terms.	OXFORD.		CAMBRIDGE.		
	Begins.	Ends.	Begins.	Divides.	Ends.
Lent - - - -	Jan. 14	Apr. 9	Jan. 13	Feb. 24, Midnight.	Apr. 8
Easter - - -	Apr. 20	June 3	Apr. 22	May 23, Midnight.	June 24
Trinity - - -	June 4	July 9	- - -	- - - - -	- - -
Michaelmas -	Oct. 10	Dec. 17	Oct. 1	Nov. 8, Noon.	Dec. 16
	The Act, July 5.		The Commencement, June 21.		



## ERRATA.

(Continued from page xv of the *Nautical Almanac* for 1869.)

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### NAUTICAL ALMANAC FOR THE YEAR 1866.

**Page 439,** Twelfth line from the top,  
*for* [0° 36' 24" 2] *read* [3° 36' 24" 2]

### NAUTICAL ALMANAC FOR THE YEAR 1867.

(*In some Copies.*)

**Page 486,** *for* April 29 7 49  $\frac{1}{2}$  8° 0'  
*read* May 11 12 27  $\frac{1}{2}$  8° 0'  
**487,** *for* July 29 2 58  $\frac{1}{2}$  □ 0°  
*read* Aug. 10 10 15  $\frac{1}{2}$  □ 0°

### NAUTICAL ALMANAC FOR THE YEAR 1869.

(*In some Copies.*)

**Page 534,** Twelfth line from the bottom,  
*for* 6<sup>h</sup> 28<sup>m</sup> *read* 12<sup>h</sup> 15<sup>m</sup>.







I

**E P H E M E R I S**  
**FOR THE YEAR**  
**1870,**  
**FOR THE MERIDIAN**  
**OF THE**  
**ROYAL OBSERVATORY AT GREENWICH.**



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Sat.	1	<sup>h m s</sup> 18 47 36.46	11.044	<sup>° ' "</sup> S. 23 0 12.5	12.55	<sup>m s</sup> 1 11.06	<sup>m s</sup> 3 51.40	<sup>s</sup> 1.185
Sun.	2	18 52 1.38	11.031	22 54 57.5	13.70	1 11.01	4 19.68	1.171
Mon.	3	18 56 25.94	11.015	22 49 15.0	14.84	1 10.96	4 47.60	1.155
Tues.	4	19 0 50.08	10.997	22 43 5.3	15.97	1 10.91	5 15.11	1.137
Wed.	5	19 5 13.79	10.978	22 36 28.6	17.09	1 10.85	5 42.18	1.119
Thur.	6	19 9 37.04	10.958	22 29 25.0	18.20	1 10.79	6 8.80	1.099
Frid.	7	19 13 59.79	10.937	22 21 54.8	19.31	1 10.72	6 34.92	1.078
Sat.	8	19 18 22.02	10.915	22 13 58.2	20.40	1 10.65	7 0.53	1.055
Sun.	9	19 22 43.70	10.891	22 5 35.4	21.49	1 10.58	7 25.58	1.032
Mon.	10	19 27 4.80	10.867	21 56 46.6	22.57	1 10.50	7 50.06	1.008
Tues.	11	19 31 25.31	10.842	21 47 32.2	23.63	1 10.43	8 13.94	0.983
Wed.	12	19 35 45.20	10.816	21 37 52.5	24.68	1 10.35	8 37.22	0.957
Thur.	13	19 40 4.46	10.789	21 27 47.6	25.72	1 10.26	8 59.86	0.929
Frid.	14	19 44 23.05	10.761	21 17 17.9	26.75	1 10.17	9 21.83	0.901
Sat.	15	19 48 40.97	10.732	21 6 23.7	27.76	1 10.08	9 43.13	0.873
Sun.	16	19 52 58.20	10.703	20 55 5.4	28.76	1 9.98	10 3.75	0.844
Mon.	17	19 57 14.72	10.673	20 43 23.1	29.75	1 9.88	10 23.66	0.815
Tues.	18	20 1 30.52	10.643	20 31 17.4	30.72	1 9.78	10 42.85	0.785
Wed.	19	20 5 45.59	10.612	20 18 48.4	31.68	1 9.68	11 1.32	0.754
Thur.	20	20 9 59.92	10.581	20 5 56.4	32.63	1 9.58	11 19.05	0.723
Frid.	21	20 14 13.51	10.550	19 52 42.0	33.56	1 9.48	11 36.03	0.692
Sat.	22	20 18 26.34	10.519	19 39 5.3	34.48	1 9.37	11 52.26	0.661
Sun.	23	20 22 38.41	10.487	19 25 6.7	35.39	1 9.26	12 7.73	0.629
Mon.	24	20 26 49.72	10.455	19 10 46.6	36.28	1 9.15	12 22.45	0.597
Tues.	25	20 31 0.26	10.423	18 56 5.3	37.15	1 9.04	12 36.39	0.565
Wed.	26	20 35 10.01	10.390	18 41 3.3	38.01	1 8.93	12 49.55	0.532
Thur.	27	20 39 18.98	10.357	18 25 40.8	38.85	1 8.81	13 1.93	0.499
Frid.	28	20 43 27.15	10.323	18 9 58.4	39.68	1 8.69	13 13.51	0.466
Sat.	29	20 47 34.50	10.289	17 53 56.4	40.48	1 8.58	13 24.28	0.432
Sun.	30	20 51 41.04	10.255	17 37 35.2	41.27	1 8.46	13 34.23	0.398
Mon.	31	20 55 46.76	10.221	17 20 55.2	42.05	1 8.35	13 43.37	0.364
Tues.	32	20 59 51.66	10.187	S. 17 3 56.9	42.81	1 8.23	13 51.69	0.329

\* Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subtracted from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
Sat.	1	<sup>h</sup> 18 <sup>m</sup> 47 <sup>s</sup> 35.76	S. 23 ° 0 ' 13.3	16 18.2	<sup>m</sup> 3 51.32	<sup>h</sup> 18 43 44.44
Sun.	2	18 52 0.59	22 54 58.5	16 18.2	4 19.59	18 47 41.00
Mon.	3	18 56 25.06	22 49 16.2	16 18.2	4 47.50	18 51 37.56
Tues.	4	19 0 49.12	22 43 6.7	16 18.2	5 15.01	18 55 34.11
Wed.	5	19 5 12.75	22 36 30.2	16 18.1	5 42.08	18 59 30.67
Thur.	6	19 9 35.92	22 29 26.9	16 18.1	6 8.69	19 3 27.23
Frid.	7	19 13 58.59	22 21 56.9	16 18.1	6 34.81	19 7 23.78
Sat.	8	19 18 20.75	22 14 0.5	16 18.1	7 0.41	19 11 20.34
Sun.	9	19 22 42.35	22 5 38.0	16 18.0	7 25.45	19 15 16.90
Mon.	10	19 27 3.38	21 56 49.6	16 18.0	7 49.93	19 19 13.45
Tues.	11	19 31 23.82	21 47 35.5	16 17.9	8 13.81	19 23 10.01
Wed.	12	19 35 43.65	21 37 56.0	16 17.9	8 37.08	19 27 6.57
Thur.	13	19 40 2.84	21 27 51.4	16 17.8	8 59.72	19 31 3.12
Frid.	14	19 44 21.37	21 17 22.1	16 17.8	9 21.69	19 34 59.68
Sat.	15	19 48 39.23	21 6 28.2	16 17.7	9 42.99	19 38 56.24
Sun.	16	19 52 56.40	20 55 10.2	16 17.6	10 3.61	19 42 52.79
Mon.	17	19 57 12.87	20 43 28.3	16 17.6	10 23.52	19 46 49.35
Tues.	18	20 1 28.62	20 31 22.8	16 17.5	10 42.71	19 50 45.91
Wed.	19	20 5 43.64	20 18 54.2	16 17.4	11 1.18	19 54 42.46
Thur.	20	20 9 57.92	20 6 2.6	16 17.3	11 18.00	19 58 39.02
Frid.	21	20 14 11.47	19 52 48.5	16 17.2	11 35.89	20 2 35.58
Sat.	22	20 18 24.26	19 39 12.1	16 17.1	11 52.13	20 6 32.13
Sun.	23	20 22 36.29	19 25 13.8	16 16.9	12 7.60	20 10 28.69
Mon.	24	20 26 47.57	19 10 54.0	16 16.8	12 22.32	20 14 25.25
Tues.	25	20 30 58.07	18 56 13.1	16 16.7	12 36.27	20 18 21.80
Wed.	26	20 35 7.79	18 41 11.4	16 16.6	12 49.43	20 22 18.36
Thur.	27	20 39 16.73	18 25 49.2	16 16.5	13 1.81	20 26 14.92
Frid.	28	20 43 24.87	18 10 7.1	16 16.3	13 13.40	20 30 11.47
Sat.	29	20 47 32.20	17 54 5.4	16 16.2	13 24.18	20 34 8.02
Sun.	30	20 51 38.72	17 37 44.5	16 16.0	13 34.14	20 38 4.58
Mon.	31	20 55 44.42	17 21 4.8	16 15.9	13 43.28	20 42 1.14
Tues.	32	20 59 49.30	S. 17 4 6.7	16 15.7	13 51.61	20 45 57.69

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	280° 56' 26".1	N. 0° 11'	9.9926796	15' 50".2	15' 45".5	58' 1".2	57' 44".0
2	281° 57' 37".4	S. 0° 01'	9.9926816	15' 40".5	15' 35".3	57' 25".7	57' 6".5
3	282° 58' 48".5	0° 14'	9.9926854	15' 29".9	15' 24".5	56' 46".8	56' 27".0
4	283° 59' 59".4	0° 27'	9.9926909	15' 19".1	15' 13".9	56' 7".4	55' 48".4
5	285° 1' 10".0	0° 38'	9.9926981	15' 9".0	15' 4".4	55' 30".4	55' 13".6
6	286° 2' 20".2	0° 49'	9.9927071	15' 0".3	14' 56".6	54' 58".4	54' 45".0
7	287° 3' 29".9	0° 58'	9.9927180	14' 53".5	14' 51".1	54' 33".7	54' 24".7
8	288° 4' 39".2	0° 64'	9.9927309	14' 49".3	14' 48".2	54' 18".1	54' 14".1
9	289° 5' 47".9	0° 68'	9.9927459	14' 47".8	14' 48".2	54' 12".7	54' 14".0
10	290° 6' 56".1	0° 70'	9.9927631	14' 49".2	14' 51".0	54' 17".9	54' 24".5
11	291° 8' 3".6	0° 69'	9.9927825	14' 53".5	14' 56".7	54' 33".7	54' 45".2
12	292° 9' 10".5	0° 65'	9.9928043	15' 0".5	15' 4".8	54' 59".1	55' 14".9
13	293° 10' 16".8	0° 59'	9.9928287	15' 9".6	15' 14".9	55' 32".6	55' 51".8
14	294° 11' 22".4	0° 52'	9.9928557	15' 20".4	15' 26".2	56' 12".2	56' 33".4
15	295° 12' 27".4	0° 40'	9.9928853	15' 32".1	15' 38".0	56' 55".0	57' 16".6
16	296° 13' 31".7	0° 28'	9.9929176	15' 43".8	15' 49".3	57' 37".7	57' 58".0
17	297° 14' 35".3	0° 16'	9.9929527	15' 54".5	15' 59".3	58' 17".1	58' 34".5
18	298° 15' 38".2	S. 0° 02'	9.9929906	16' 3".5	16' 7".1	58' 50".0	59' 3".3
19	299° 16' 40".5	N. 0° 11'	9.9930312	16' 10".1	16' 12".4	59' 14".2	59' 22".7
20	300° 17' 42".2	0° 23'	9.9930746	16' 14".1	16' 15".1	59' 28".8	59' 32".5
21	301° 18' 43".4	0° 32'	9.9931208	16' 15".5	16' 15".3	59' 33".9	59' 33".2
22	302° 19' 44".0	0° 40'	9.9931695	16' 14".6	16' 13".4	59' 30".6	59' 26".3
23	303° 20' 44".2	0° 43'	9.9932205	16' 11".8	16' 9".9	59' 20".5	59' 13".5
24	304° 21' 43".8	0° 43'	9.9932737	16' 7".7	16' 5".3	59' 5".5	58' 56".5
25	305° 22' 42".9	0° 40'	9.9933289	16' 2".6	15' 59".8	58' 46".7	58' 36".3
26	306° 23' 41".6	0° 34'	9.9933860	15' 56".7	15' 53".5	58' 25".2	58' 13".5
27	307° 24' 39".6	0° 27'	9.9934449	15' 50".2	15' 46".7	58' 1".3	57' 48".6
28	308° 25' 36".8	0° 16'	9.9935054	15' 43".1	15' 39".3	57' 35".3	57' 21".5
29	309° 26' 33".3	N. 0° 04'	9.9935673	15' 35".5	15' 31".5	57' 7".3	56' 52".6
30	310° 27' 28".8	S. 0° 08'	9.9936306	15' 27".4	15' 23".2	56' 37".6	56' 22".3
31	311° 28' 23".3	0° 21'	9.9936953	15' 19".0	15' 14".8	56' 6".9	55' 51".6
32	312° 29' 16".7	S. 0° 33'	9.9937612	15' 10".7	15' 6".7	55' 36".6	55' 22".0



## MEAN TIME.

## THE MOON'S

Day of the Week. Day of the Month.		THE MOON'S							
		Longitude.		Latitude.		Age.	Meridian		
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.		
Sat.	1	274 36 59.7	281 24 13.1	N.2 7 40.9	N.1 32 37.5	29.1	d	h	m
Sun.	2	288 7 3.7	294 45 19.0	N.0 56 37.8	N.0 20 14.6	0.5	0	31.5	
Mon.	3	301 18 51.6	307 47 39.6	S.0 16 0.3	S.0 51 37.7	1.5	1	25.9	
Tues.	4	314 11 46.2	320 31 20.2	1 26 10.9	1 59 16.5	2.5	2	17.5	
Wed.	5	326 46 35.0	332 57 48.4	2 30 33.6	2 59 44.3	3.5	3	5.9	
Thur.	6	339 5 22.4	345 9 42.3	3 26 33.6	3 50 48.5	4.5	3	51.5	
Frid.	7	351 11 16.6	357 10 36.4	4 12 18.6	4 30 55.0	5.5	4	34.8	
Sat.	8	3 8 14.4	9 4 45.1	4 46 30.1	4 58 57.8	6.5	5	16.6	
Sun.	9	15 0 44.2	20 56 47.6	5 8 12.8	5 14 10.7	7.5	5	57.9	
Mon.	10	26 53 31.4	32 51 31.3	5 16 47.6	5 16 0.6	8.5	6	39.5	
Tues.	11	38 51 22.0	44 53 36.9	5 11 47.3	5 4 6.5	9.5	7	22.4	
Wed.	12	50 58 47.8	57 7 23.4	4 52 57.5	4 38 21.7	10.5	8	7.4	
Thur.	13	63 19 49.7	69 36 29.3	4 20 21.7	3 59 2.8	11.5	8	55.1	
Frid.	14	75 57 40.9	82 23 38.4	3 34 32.4	3 7 1.4	12.5	9	45.9	
Sat.	15	88 54 30.0	95 30 19.9	2 36 43.8	2 3 58.1	13.5	10	39.8	
Sun.	16	102 11 6.2	108 56 41.1	1 29 6.0	S.0 52 33.7	14.5	11	35.8	
Mon.	17	115 46 51.5	122 41 18.8	S.0 14 51.3	N.0 23 27.8	15.5	12	32.7	
Tues.	18	129 39 40.0	136 41 27.6	N.1 1 47.3	1 39 29.3	16.5	13	29.3	
Wed.	19	143 46 11.1	150 53 17.7	2 15 54.9	2 50 25.6	17.5	14	24.5	
Thur.	20	158 2 12.7	165 12 21.7	3 22 24.8	3 51 18.1	18.5	15	17.9	
Frid.	21	172 23 10.7	179 34 7.2	4 16 35.5	4 37 50.9	19.5	16	9.9	
Sat.	22	186 44 41.1	193 54 24.9	4 54 44.1	5 6 59.5	20.5	17	0.9	
Sun.	23	201 2 54.6	208 9 48.9	5 14 27.7	5 17 4.6	21.5	17	51.8	
Mon.	24	215 14 50.0	222 17 43.1	5 14 51.3	5 7 54.0	22.5	18	43.4	
Tues.	25	229 18 15.8	236 16 18.1	4 56 23.1	4 40 34.1	23.5	19	36.3	
Wed.	26	243 11 41.8	250 4 19.9	4 20 45.0	3 57 17.7	24.5	20	30.6	
Thur.	27	256 54 6.8	263 40 57.2	3 30 37.0	3 1 9.4	25.5	21	25.9	
Frid.	28	270 24 46.1	277 5 29.6	2 29 23.5	1 55 49.2	26.5	22	21.2	
Sat.	29	283 43 3.0	290 17 23.2	1 20 56.9	N.0 45 17.1	27.5	23	15.6	
Sun.	30	296 48 26.9	303 16 11.8	N.0 9 19.9	S.0 26 25.4	28.5	6		
Mon.	31	309 40 37.0	316 1 42.4	S.1 1 31.2	1 35 31.6	29.5	0	7.9	
Tues.	32	322 19 30.6	328 34 5.5	S.2 8 3.1	S.2 38 44.1	0.8	0	57.5	



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>SATURDAY 1.</b>				<b>MONDAY 3.</b>			
0	<sup>h</sup> 18 <sup>m</sup> 19 <sup>s</sup> 48.16	S. 21 14 50.5	16.93	0	<sup>h</sup> 20 <sup>m</sup> 14 <sup>s</sup> 27.03	S. 20 8 23.1	42.54
1	18 22 14.76	21 16 28.1	15.60	1	20 16 45.18	20 4 4.6	43.62
2	18 24 41.29	21 17 57.7	14.27	2	20 19 3.06	19 59 39.6	44.69
3	18 27 7.76	21 19 19.3	12.93	3	20 21 20.67	19 55 8.3	45.74
4	18 29 34.16	21 20 32.9	11.61	4	20 23 38.01	19 50 30.7	46.79
5	18 32 0.48	21 21 38.6	10.28	5	20 25 55.07	19 45 46.8	47.83
6	18 34 26.71	21 22 36.3	8.96	6	20 28 11.85	19 40 56.7	48.86
7	18 36 52.85	21 23 26.1	7.64	7	20 30 28.36	19 36 0.5	49.89
8	18 39 18.90	21 24 8.0	6.32	8	20 32 44.58	19 30 58.1	50.90
9	18 41 44.85	21 24 41.9	4.99	9	20 35 0.52	19 25 49.7	51.89
10	18 44 10.69	21 25 7.9	3.67	10	20 37 16.17	19 20 35.4	52.88
11	18 46 36.42	21 25 26.0	2.36	11	20 39 31.54	19 15 15.1	53.87
12	18 49 2.04	21 25 36.2	1.05	12	20 41 46.62	19 9 48.9	54.85
13	18 51 27.53	21 25 38.6	0.26	13	20 44 1.41	19 4 16.9	55.81
14	18 53 52.90	21 25 33.1	1.57	14	20 46 15.91	18 58 39.2	56.76
15	18 56 18.14	21 25 19.8	2.87	15	20 48 30.11	18 52 55.8	57.70
16	18 58 43.24	21 24 58.7	4.16	16	20 50 44.02	18 47 6.8	58.63
17	19 1 8.20	21 24 29.9	5.45	17	20 52 57.64	18 41 12.2	59.56
18	19 3 33.01	21 23 53.3	6.74	18	20 55 10.96	18 35 12.0	60.48
19	19 5 57.67	21 23 9.0	8.03	19	20 57 23.99	18 29 6.4	61.38
20	19 8 22.18	21 22 17.0	9.31	20	20 59 36.72	18 22 55.4	62.27
21	19 10 46.52	21 21 17.3	10.58	21	21 1 49.16	18 16 39.1	63.16
22	19 13 10.70	21 20 10.1	11.84	22	21 4 1.29	18 10 17.5	64.04
23	19 15 34.71	S. 21 18 55.2	13.12	23	21 6 13.13	S. 18 3 50.6	64.91
<b>SUNDAY 2.</b>				<b>TUESDAY 4.</b>			
0	19 17 58.54	S. 21 17 32.7	14.38	0	21 8 24.67	S. 17 57 18.6	65.76
1	19 20 22.19	21 16 2.7	15.63	1	21 10 35.91	17 50 41.5	66.61
2	19 22 45.66	21 14 25.2	16.87	2	21 12 46.85	17 43 59.3	67.45
3	19 25 8.94	21 12 40.3	18.11	3	21 14 57.50	17 37 12.1	68.27
4	19 27 32.02	21 10 47.9	19.34	4	21 17 7.85	17 30 20.1	69.08
5	19 29 54.91	21 8 48.2	20.58	5	21 19 17.89	17 23 23.1	69.90
6	19 32 17.60	21 6 41.0	21.81	6	21 21 27.64	17 16 21.3	70.70
7	19 34 40.07	21 4 26.5	23.02	7	21 23 37.09	17 9 14.7	71.48
8	19 37 2.34	21 2 4.8	24.22	8	21 25 46.24	17 2 3.5	72.26
9	19 39 24.40	20 59 35.9	25.43	9	21 27 55.09	16 54 47.6	73.03
10	19 41 46.23	20 56 59.7	26.63	10	21 30 3.65	16 47 27.2	73.78
11	19 44 7.85	20 54 16.3	27.82	11	21 32 11.91	16 40 2.2	74.53
12	19 46 29.24	20 51 25.9	28.99	12	21 34 19.87	16 32 32.8	75.27
13	19 48 50.40	20 48 28.4	30.17	13	21 36 27.54	16 24 59.0	76.00
14	19 51 11.32	20 45 23.9	31.33	14	21 38 34.91	16 17 20.8	76.72
15	19 53 32.01	20 42 12.4	32.50	15	21 40 41.99	16 9 38.4	77.43
16	19 55 52.46	20 38 53.9	33.65	16	21 42 48.78	16 1 51.7	78.13
17	19 58 12.66	20 35 28.6	34.78	17	21 44 55.28	15 54 0.8	78.82
18	20 0 32.62	20 31 56.5	35.92	18	21 47 1.49	15 46 5.9	79.49
19	20 2 52.33	20 28 17.6	37.05	19	21 49 7.40	15 38 6.9	80.17
20	20 5 11.78	20 24 31.9	38.17	20	21 51 13.03	15 30 3.8	80.83
21	20 7 30.98	20 20 39.6	39.27	21	21 53 18.37	15 21 56.8	81.48
22	20 9 49.92	20 16 40.7	40.37	22	21 55 23.43	15 13 46.0	82.13
23	20 12 8.61	20 12 35.1	41.46	23	21 57 28.20	15 5 31.3	82.76
24	20 14 27.03	S. 20 8 23.1	42.54	24	21 59 32.69	S. 14 57 12.9	83.38



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>WEDNESDAY 5.</b>				<b>FRIDAY 7.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	21 59 32.69	S. 14 57 12.9	83.38	0	23 34 18.13	S. 7 21 31.2	103.42
1	22 1 36.90	14 48 50.7	84.00	1	23 36 11.62	7 11 10.0	103.65
2	22 3 40.83	14 40 24.9	84.60	2	23 38 4.95	7 0 47.4	103.88
3	22 5 44.48	14 31 55.5	85.20	3	23 39 58.14	6 50 23.5	104.10
4	22 7 47.86	14 23 22.5	85.79	4	23 41 51.18	6 39 58.2	104.32
5	22 9 50.96	14 14 46.0	86.37	5	23 43 44.08	6 29 31.7	104.52
6	22 11 53.79	14 6 6.0	86.94	6	23 45 36.84	6 19 4.0	104.72
7	22 13 56.35	13 57 22.7	87.50	7	23 47 29.46	6 8 35.1	104.91
8	22 15 58.64	13 48 36.0	88.05	8	23 49 21.96	5 58 5.1	105.10
9	22 18 0.67	13 39 46.1	88.59	9	23 51 14.32	5 47 33.9	105.28
10	22 20 2.43	13 30 52.9	89.12	10	23 53 6.56	5 37 1.7	105.45
11	22 22 3.93	13 21 56.6	89.65	11	23 54 58.68	5 26 28.5	105.62
12	22 24 5.17	13 12 57.1	90.17	12	23 56 50.67	5 15 54.3	105.78
13	22 26 6.15	13 3 54.6	90.68	13	23 58 42.55	5 5 19.1	105.94
14	22 28 6.88	12 54 49.0	91.18	14	0 0 34.33	4 54 43.0	106.09
15	22 30 7.35	12 45 40.5	91.66	15	0 2 25.99	4 44 6.0	106.23
16	22 32 7.57	12 36 29.1	92.14	16	0 4 17.55	4 33 28.2	106.37
17	22 34 7.54	12 27 14.8	92.62	17	0 6 9.01	4 22 49.6	106.50
18	22 36 7.27	12 17 57.7	93.08	18	0 8 0.37	4 12 10.2	106.63
19	22 38 6.76	12 8 37.8	93.54	19	0 9 51.63	4 1 30.0	106.76
20	22 40 6.00	11 59 15.2	93.99	20	0 11 42.80	3 50 49.1	106.87
21	22 42 5.00	11 49 49.9	94.43	21	0 13 33.89	3 40 7.6	106.97
22	22 44 3.77	11 40 22.0	94.87	22	0 15 24.89	3 29 25.5	107.07
23	22 46 2.31	S. 11 30 51.5	95.28	23	0 17 15.81	S. 3 18 42.8	107.17
<b>THURSDAY 6.</b>				<b>SATURDAY 8.</b>			
0	22 48 0.61	S. 11 21 18.6	95.69	0	0 19 6.65	S. 3 7 59.5	107.26
1	22 49 58.69	11 11 43.2	96.11	1	0 20 57.42	2 57 15.7	107.35
2	22 51 56.54	11 2 5.3	96.51	2	0 22 48.12	2 46 31.3	107.43
3	22 53 54.16	10 52 25.1	96.90	3	0 24 38.76	2 35 46.5	107.50
4	22 55 51.57	10 42 42.5	97.29	4	0 26 29.33	2 25 1.3	107.57
5	22 57 48.76	10 32 57.6	97.67	5	0 28 19.85	2 14 15.7	107.63
6	22 59 45.74	10 23 10.5	98.03	6	0 30 10.31	2 3 29.8	107.68
7	23 1 42.50	10 13 21.2	98.39	7	0 32 0.72	1 52 43.5	107.73
8	23 3 39.06	10 3 29.8	98.74	8	0 33 51.08	1 41 57.0	107.78
9	23 5 35.41	9 53 36.3	99.09	9	0 35 41.40	1 31 10.2	107.82
10	23 7 31.56	9 43 40.7	99.43	10	0 37 31.67	1 20 23.2	107.85
11	23 9 27.52	9 33 43.1	99.77	11	0 39 21.91	1 9 36.0	107.87
12	23 11 23.27	9 23 43.5	100.09	12	0 41 12.11	0 58 48.7	107.89
13	23 13 18.83	9 13 42.0	100.40	13	0 43 2.28	0 48 1.3	107.91
14	23 15 14.20	9 3 38.7	100.71	14	0 44 52.43	0 37 13.8	107.93
15	23 17 9.38	8 53 33.5	101.02	15	0 46 42.55	0 26 26.2	107.93
16	23 19 4.38	8 43 26.5	101.31	16	0 48 32.65	0 15 38.6	107.93
17	23 20 59.20	8 33 17.8	101.60	17	0 50 22.74	S. 0 4 51.1	107.92
18	23 22 53.84	8 23 7.3	101.88	18	0 52 12.82	N. 0 5 56.4	107.91
19	23 24 48.30	8 12 55.2	102.15	19	0 54 2.89	0 16 43.8	107.89
20	23 26 42.60	8 2 41.5	102.42	20	0 55 52.95	0 27 31.1	107.87
21	23 28 36.73	7 52 26.2	102.68	21	0 57 43.00	0 38 18.3	107.84
22	23 30 30.69	7 42 9.3	102.93	22	0 59 33.06	0 49 5.2	107.80
23	23 32 24.49	7 31 51.0	103.17	23	1 1 23.13	0 59 51.9	107.77
24	23 34 18.13	S. 7 21 31.2	103.42	24	1 3 13.20	N. 1 10 38.4	107.73



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>ms</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>ms</sup> .
<b>SUNDAY 9.</b>				<b>TUESDAY 11.</b>			
0	h m s	N. ° ' "	"	0	h m s	N. ° ' "	"
1	1 3 13.20	1 10 38.4	107.73	1	2 32 36.36	9 31 54.2	98.85
2	1 5 3.29	1 21 24.6	107.68	2	2 34 31.16	9 41 46.3	98.51
3	1 6 53.39	1 32 10.5	107.63	3	2 36 26.14	9 51 36.4	98.17
4	1 8 43.51	1 42 56.1	107.57	4	2 38 21.31	10 1 24.4	97.83
5	1 10 33.65	1 53 41.3	107.50	5	2 40 16.67	10 11 10.3	97.47
6	1 12 23.82	2 4 26.1	107.43	6	2 42 12.21	10 20 54.0	97.10
7	1 14 14.02	2 15 10.4	107.35	7	2 44 7.95	10 30 35.5	96.73
8	1 16 4.26	2 25 54.3	107.27	8	2 46 3.88	10 40 14.8	96.36
9	1 17 54.53	2 36 37.6	107.18	9	2 48 0.01	10 49 51.8	95.97
10	1 19 44.84	2 47 20.4	107.08	10	2 49 56.35	10 59 26.4	95.58
11	1 21 35.20	2 58 2.6	106.98	11	2 51 52.89	11 8 58.7	95.18
12	1 23 25.61	3 8 44.2	106.88	12	2 53 49.63	11 18 28.5	94.77
13	1 25 16.06	3 19 25.1	106.77	13	2 55 46.59	11 27 55.9	94.36
14	1 27 6.57	3 30 5.4	106.65	14	2 57 43.76	11 37 20.8	93.93
15	1 28 57.14	3 40 44.9	106.53	15	2 59 41.15	11 46 43.1	93.50
16	1 30 47.77	3 51 23.7	106.40	16	3 1 38.76	11 56 2.8	93.07
17	1 32 38.47	4 2 1.7	106.27	17	3 3 36.59	12 5 19.9	92.63
18	1 34 29.24	4 12 38.9	106.13	18	3 5 34.64	12 14 34.4	92.18
19	1 36 20.08	4 23 15.3	105.99	19	3 7 32.93	12 23 46.1	91.72
20	1 38 11.00	4 33 50.8	105.83	20	3 9 31.44	12 32 55.0	91.24
21	1 40 2.00	4 44 25.3	105.68	21	3 11 30.19	12 42 1.0	90.77
22	1 41 53.08	4 54 58.9	105.52	22	3 13 29.17	12 51 4.2	90.29
23	1 43 44.24	5 5 31.5	105.35	23	3 15 28.39	13 0 4.5	89.81
24	1 45 35.50	N. 5 16 3.1	105.17	24	3 17 27.85	N. 13 9 1.9	89.31
<b>MONDAY 10.</b>				<b>WEDNESDAY 12.</b>			
0	1 47 26.86	N. 5 26 33.6	104.99	0	3 19 27.55	N. 13 17 56.2	88.79
1	1 49 18.31	5 37 3.0	104.81	1	3 21 27.50	13 26 47.4	88.27
2	1 51 9.86	5 47 31.3	104.62	2	3 23 27.70	13 35 35.5	87.76
3	1 53 1.51	5 57 58.4	104.43	3	3 25 28.15	13 44 20.5	87.23
4	1 54 53.28	6 8 24.4	104.22	4	3 27 28.85	13 53 2.3	86.69
5	1 56 45.15	6 18 49.1	104.01	5	3 29 29.80	14 1 40.8	86.14
6	1 58 37.14	6 29 12.5	103.79	6	3 31 31.01	14 10 16.0	85.58
7	2 0 29.24	6 39 34.6	103.57	7	3 33 32.49	14 18 47.8	85.02
8	2 2 21.47	6 49 55.4	103.34	8	3 35 34.22	14 27 16.2	84.44
9	2 4 13.82	7 0 14.7	103.11	9	3 37 36.22	14 35 41.1	83.87
10	2 6 6.30	7 10 32.7	102.87	10	3 39 38.48	14 44 2.6	83.28
11	2 7 58.91	7 20 49.2	102.63	11	3 41 41.02	14 52 20.5	82.68
12	2 9 51.66	7 31 4.2	102.38	12	3 43 43.82	15 0 34.7	82.07
13	2 11 44.55	7 41 17.7	102.12	13	3 45 46.89	15 8 45.3	81.46
14	2 13 37.58	7 51 29.6	101.85	14	3 47 50.24	15 16 52.2	80.84
15	2 15 30.75	8 1 39.9	101.58	15	3 49 53.86	15 24 55.4	80.21
16	2 17 24.07	8 11 48.6	101.31	16	3 51 57.76	15 32 54.7	79.56
17	2 19 17.54	8 21 55.6	101.02	17	3 54 1.94	15 40 50.1	78.92
18	2 21 11.17	8 32 0.9	100.73	18	3 56 6.40	15 48 41.7	78.26
19	2 23 4.95	8 42 4.4	100.43	19	3 58 11.14	15 56 29.2	77.58
20	2 24 58.90	8 52 6.1	100.13	20	4 0 16.16	16 4 12.7	76.91
21	2 26 53.01	9 2 6.0	99.83	21	4 2 21.47	16 11 52.1	76.22
22	2 28 47.29	9 12 4.0	99.51	22	4 4 27.07	16 19 27.4	75.52
23	2 30 41.74	9 22 0.1	99.18	23	4 6 32.95	16 26 58.4	74.82
24	2 32 36.36	N. 9 31 54.2	98.85	24	4 8 39.12	N. 16 34 25.2	74.11



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 13.</b>				<b>SATURDAY 15.</b>			
0	4 8 39 <sup>12</sup>	N.16 34 25 <sup>2</sup>	74 <sup>11</sup>	0	5 55 19 <sup>95</sup>	N.20 50 17 <sup>6</sup>	28 <sup>98</sup>
1	4 10 45 <sup>58</sup>	16 41 47 <sup>7</sup>	73 <sup>38</sup>	1	5 57 40 <sup>12</sup>	20 53 8 <sup>0</sup>	27 <sup>82</sup>
2	4 12 52 <sup>33</sup>	16 49 5 <sup>8</sup>	72 <sup>66</sup>	2	6 0 0 <sup>54</sup>	20 55 51 <sup>4</sup>	26 <sup>65</sup>
3	4 14 59 <sup>38</sup>	16 56 19 <sup>6</sup>	71 <sup>92</sup>	3	6 2 21 <sup>20</sup>	20 58 27 <sup>8</sup>	25 <sup>48</sup>
4	4 17 6 <sup>72</sup>	17 3 28 <sup>8</sup>	71 <sup>16</sup>	4	6 4 42 <sup>09</sup>	21 0 57 <sup>2</sup>	24 <sup>30</sup>
5	4 19 14 <sup>35</sup>	17 10 33 <sup>5</sup>	70 <sup>41</sup>	5	6 7 3 <sup>22</sup>	21 3 19 <sup>4</sup>	23 <sup>11</sup>
6	4 21 22 <sup>28</sup>	17 17 33 <sup>7</sup>	69 <sup>64</sup>	6	6 9 24 <sup>58</sup>	21 5 34 <sup>5</sup>	21 <sup>92</sup>
7	4 23 30 <sup>50</sup>	17 24 29 <sup>2</sup>	68 <sup>86</sup>	7	6 11 46 <sup>17</sup>	21 7 42 <sup>5</sup>	20 <sup>72</sup>
8	4 25 39 <sup>02</sup>	17 31 20 <sup>0</sup>	68 <sup>07</sup>	8	6 14 7 <sup>98</sup>	21 9 43 <sup>2</sup>	19 <sup>51</sup>
9	4 27 47 <sup>84</sup>	17 38 6 <sup>0</sup>	67 <sup>28</sup>	9	6 16 30 <sup>01</sup>	21 11 36 <sup>6</sup>	18 <sup>29</sup>
10	4 29 56 <sup>95</sup>	17 44 47 <sup>3</sup>	66 <sup>47</sup>	10	6 18 52 <sup>25</sup>	21 13 22 <sup>7</sup>	17 <sup>07</sup>
11	4 32 6 <sup>36</sup>	17 51 23 <sup>7</sup>	65 <sup>65</sup>	11	6 21 14 <sup>71</sup>	21 15 1 <sup>5</sup>	15 <sup>85</sup>
12	4 34 16 <sup>08</sup>	17 57 55 <sup>1</sup>	64 <sup>83</sup>	12	6 23 37 <sup>37</sup>	21 16 32 <sup>9</sup>	14 <sup>62</sup>
13	4 36 26 <sup>09</sup>	18 4 21 <sup>6</sup>	64 <sup>00</sup>	13	6 26 0 <sup>24</sup>	21 17 56 <sup>9</sup>	13 <sup>38</sup>
14	4 38 36 <sup>40</sup>	18 10 43 <sup>1</sup>	63 <sup>16</sup>	14	6 28 23 <sup>31</sup>	21 19 13 <sup>4</sup>	12 <sup>13</sup>
15	4 40 47 <sup>00</sup>	18 16 59 <sup>5</sup>	62 <sup>30</sup>	15	6 30 46 <sup>57</sup>	21 20 22 <sup>5</sup>	10 <sup>88</sup>
16	4 42 57 <sup>90</sup>	18 23 10 <sup>7</sup>	61 <sup>43</sup>	16	6 33 10 <sup>03</sup>	21 21 24 <sup>0</sup>	9 <sup>62</sup>
17	4 45 9 <sup>11</sup>	18 29 16 <sup>7</sup>	60 <sup>56</sup>	17	6 35 33 <sup>67</sup>	21 22 18 <sup>0</sup>	8 <sup>36</sup>
18	4 47 20 <sup>61</sup>	18 35 17 <sup>4</sup>	59 <sup>68</sup>	18	6 37 57 <sup>49</sup>	21 23 4 <sup>3</sup>	7 <sup>09</sup>
19	4 49 32 <sup>41</sup>	18 41 12 <sup>9</sup>	58 <sup>80</sup>	19	6 40 21 <sup>49</sup>	21 23 43 <sup>1</sup>	5 <sup>82</sup>
20	4 51 44 <sup>51</sup>	18 47 3 <sup>0</sup>	57 <sup>89</sup>	20	6 42 45 <sup>66</sup>	21 24 14 <sup>2</sup>	4 <sup>54</sup>
21	4 53 56 <sup>90</sup>	18 52 47 <sup>6</sup>	56 <sup>97</sup>	21	6 45 10 <sup>00</sup>	21 24 37 <sup>6</sup>	3 <sup>26</sup>
22	4 56 9 <sup>59</sup>	18 58 26 <sup>7</sup>	56 <sup>06</sup>	22	6 47 34 <sup>51</sup>	21 24 53 <sup>3</sup>	1 <sup>97</sup>
23	4 58 22 <sup>58</sup>	N.19 4 0 <sup>3</sup>	55 <sup>13</sup>	23	6 49 59 <sup>17</sup>	N.21 25 1 <sup>2</sup>	0 <sup>68</sup>
<b>FRIDAY 14.</b>				<b>SUNDAY 16.</b>			
0	5 0 35 <sup>87</sup>	N.19 9 28 <sup>3</sup>	54 <sup>19</sup>	0	6 52 23 <sup>98</sup>	N.21 25 1 <sup>4</sup>	0 <sup>62</sup>
1	5 2 49 <sup>45</sup>	19 14 50 <sup>6</sup>	53 <sup>25</sup>	1	6 54 48 <sup>94</sup>	21 24 53 <sup>8</sup>	1 <sup>92</sup>
2	5 5 3 <sup>32</sup>	19 20 7 <sup>3</sup>	52 <sup>30</sup>	2	6 57 14 <sup>05</sup>	21 24 38 <sup>4</sup>	3 <sup>22</sup>
3	5 7 17 <sup>49</sup>	19 25 18 <sup>2</sup>	51 <sup>33</sup>	3	6 59 39 <sup>30</sup>	21 24 15 <sup>2</sup>	4 <sup>52</sup>
4	5 9 31 <sup>95</sup>	19 30 23 <sup>2</sup>	50 <sup>34</sup>	4	7 2 4 <sup>68</sup>	21 23 44 <sup>1</sup>	5 <sup>83</sup>
5	5 11 46 <sup>70</sup>	19 35 22 <sup>3</sup>	49 <sup>36</sup>	5	7 4 30 <sup>19</sup>	21 23 5 <sup>2</sup>	7 <sup>14</sup>
6	5 14 1 <sup>74</sup>	19 40 15 <sup>5</sup>	48 <sup>37</sup>	6	7 6 55 <sup>82</sup>	21 22 18 <sup>4</sup>	8 <sup>47</sup>
7	5 16 17 <sup>07</sup>	19 45 2 <sup>8</sup>	47 <sup>37</sup>	7	7 9 21 <sup>57</sup>	21 21 23 <sup>6</sup>	9 <sup>79</sup>
8	5 18 32 <sup>68</sup>	19 49 44 <sup>0</sup>	46 <sup>36</sup>	8	7 11 47 <sup>43</sup>	21 20 20 <sup>9</sup>	11 <sup>11</sup>
9	5 20 48 <sup>58</sup>	19 54 19 <sup>1</sup>	45 <sup>33</sup>	9	7 14 13 <sup>40</sup>	21 19 10 <sup>3</sup>	12 <sup>43</sup>
10	5 23 4 <sup>77</sup>	19 58 48 <sup>0</sup>	44 <sup>30</sup>	10	7 16 39 <sup>48</sup>	21 17 51 <sup>7</sup>	13 <sup>76</sup>
11	5 25 21 <sup>24</sup>	20 3 10 <sup>7</sup>	43 <sup>27</sup>	11	7 19 5 <sup>65</sup>	21 16 25 <sup>2</sup>	15 <sup>08</sup>
12	5 27 37 <sup>99</sup>	20 7 27 <sup>2</sup>	42 <sup>23</sup>	12	7 21 31 <sup>92</sup>	21 14 50 <sup>7</sup>	16 <sup>42</sup>
13	5 29 55 <sup>01</sup>	20 11 37 <sup>4</sup>	41 <sup>17</sup>	13	7 23 58 <sup>27</sup>	21 13 8 <sup>2</sup>	17 <sup>75</sup>
14	5 32 12 <sup>31</sup>	20 15 41 <sup>2</sup>	40 <sup>09</sup>	14	7 26 24 <sup>71</sup>	21 11 17 <sup>7</sup>	19 <sup>08</sup>
15	5 34 29 <sup>89</sup>	20 19 38 <sup>5</sup>	39 <sup>02</sup>	15	7 28 51 <sup>22</sup>	21 9 19 <sup>2</sup>	20 <sup>42</sup>
16	5 36 47 <sup>73</sup>	20 23 29 <sup>4</sup>	37 <sup>94</sup>	16	7 31 17 <sup>80</sup>	21 7 12 <sup>7</sup>	21 <sup>74</sup>
17	5 39 5 <sup>84</sup>	20 27 13 <sup>8</sup>	36 <sup>86</sup>	17	7 33 44 <sup>45</sup>	21 4 58 <sup>3</sup>	23 <sup>08</sup>
18	5 41 24 <sup>22</sup>	20 30 51 <sup>7</sup>	35 <sup>76</sup>	18	7 36 11 <sup>16</sup>	21 2 35 <sup>8</sup>	24 <sup>42</sup>
19	5 43 42 <sup>87</sup>	20 34 22 <sup>9</sup>	34 <sup>64</sup>	19	7 38 37 <sup>92</sup>	21 0 5 <sup>3</sup>	25 <sup>75</sup>
20	5 46 1 <sup>77</sup>	20 37 47 <sup>4</sup>	33 <sup>52</sup>	20	7 41 4 <sup>74</sup>	20 57 26 <sup>8</sup>	27 <sup>08</sup>
21	5 48 20 <sup>94</sup>	20 41 5 <sup>1</sup>	32 <sup>39</sup>	21	7 43 31 <sup>60</sup>	20 54 40 <sup>3</sup>	28 <sup>42</sup>
22	5 50 40 <sup>36</sup>	20 44 16 <sup>1</sup>	31 <sup>27</sup>	22	7 45 58 <sup>50</sup>	20 51 45 <sup>8</sup>	29 <sup>75</sup>
23	5 53 0 <sup>03</sup>	20 47 20 <sup>3</sup>	30 <sup>13</sup>	23	7 48 25 <sup>43</sup>	20 48 43 <sup>3</sup>	31 <sup>08</sup>
24	5 55 19 <sup>95</sup>	N.20 50 17 <sup>6</sup>	28 <sup>98</sup>	24	7 50 52 <sup>39</sup>	N.20 45 32 <sup>9</sup>	32 <sup>41</sup>



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>MONDAY 17.</b>				<b>WEDNESDAY 19.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	7 50 52.39	N. 20 45 32.9	32.41	0	9 47 28.76	N. 15 44 34.6	90.38
1	7 53 19.37	20 42 14.4	33.74	1	9 49 51.77	15 35 29.3	91.38
2	7 55 46.37	20 38 48.0	35.07	2	9 52 14.62	15 26 18.0	92.37
3	7 58 13.39	20 35 13.6	36.39	3	9 54 37.32	15 17 0.8	93.36
4	8 0 40.41	20 31 31.3	37.71	4	9 56 59.86	15 7 37.7	94.33
5	8 3 7.44	20 27 41.1	39.03	5	9 59 22.23	14 58 8.9	95.28
6	8 5 34.46	20 23 42.9	40.35	6	10 1 44.45	14 48 34.3	96.23
7	8 8 1.48	20 19 36.9	41.67	7	10 4 6.50	14 38 54.1	97.16
8	8 10 28.49	20 15 22.9	42.98	8	10 6 28.39	14 29 8.4	98.08
9	8 12 55.47	20 11 1.1	44.28	9	10 8 50.11	14 19 17.1	99.00
10	8 15 22.44	20 6 31.5	45.59	10	10 11 11.67	14 9 20.4	99.89
11	8 17 49.38	20 1 54.0	46.90	11	10 13 33.06	13 59 18.4	100.78
12	8 20 16.28	19 57 8.7	48.20	12	10 15 54.29	13 49 11.0	101.66
13	8 22 43.15	19 52 15.6	49.49	13	10 18 15.35	13 38 58.5	102.52
14	8 25 9.98	19 47 14.8	50.78	14	10 20 36.24	13 28 40.8	103.36
15	8 27 36.76	19 42 6.3	52.06	15	10 22 56.97	13 18 18.1	104.19
16	8 30 3.49	19 36 50.1	53.34	16	10 25 17.52	13 7 50.5	105.02
17	8 32 30.17	19 31 26.2	54.62	17	10 27 37.91	12 57 17.9	105.83
18	8 34 56.79	19 25 54.7	55.88	18	10 29 58.13	12 46 40.5	106.63
19	8 37 23.34	19 20 15.6	57.14	19	10 32 18.19	12 35 58.3	107.42
20	8 39 49.83	19 14 29.0	58.40	20	10 34 38.07	12 25 11.4	108.20
21	8 42 16.24	19 8 34.8	59.66	21	10 36 57.79	12 14 19.9	108.96
22	8 44 42.58	19 2 33.1	60.90	22	10 39 17.34	12 3 23.9	109.70
23	8 47 8.83	N. 18 56 24.0	62.13	23	10 41 36.72	N. 11 52 23.5	110.43
<b>TUESDAY 18.</b>				<b>THURSDAY 20.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	8 49 35.00	N. 18 50 7.6	63.35	0	10 43 55.94	N. 11 41 18.7	111.16
1	8 52 1.08	18 43 43.8	64.58	1	10 46 14.99	11 30 9.6	111.87
2	8 54 27.07	18 37 12.6	65.81	2	10 48 33.88	11 18 56.3	112.57
3	8 56 52.96	18 30 34.1	67.02	3	10 50 52.61	11 7 38.8	113.25
4	8 59 18.76	18 23 48.4	68.21	4	10 53 11.17	10 56 17.3	113.92
5	9 1 44.45	18 16 55.6	69.40	5	10 55 29.57	10 44 51.8	114.58
6	9 4 10.03	18 9 55.6	70.59	6	10 57 47.81	10 33 22.4	115.22
7	9 6 35.50	18 2 48.5	71.78	7	11 0 5.90	10 21 49.2	115.84
8	9 9 0.86	17 55 34.3	72.94	8	11 2 23.82	10 10 12.3	116.46
9	9 11 26.10	17 48 13.2	74.10	9	11 4 41.59	9 58 31.7	117.07
10	9 13 51.21	17 40 45.1	75.25	10	11 6 59.20	9 46 47.5	117.65
11	9 16 16.21	17 33 10.2	76.39	11	11 9 16.65	9 34 59.9	118.22
12	9 18 41.08	17 25 28.4	77.53	12	11 11 33.95	9 23 8.8	118.79
13	9 21 5.82	17 17 39.8	78.66	13	11 13 51.10	9 11 14.4	119.34
14	9 23 30.43	17 9 44.5	79.77	14	11 16 8.11	8 59 16.7	119.88
15	9 25 54.91	17 1 42.6	80.88	15	11 18 24.96	8 47 15.9	120.40
16	9 28 19.25	16 53 34.0	81.98	16	11 20 41.67	8 35 11.9	120.91
17	9 30 43.45	16 45 18.8	83.07	17	11 22 58.24	8 23 5.0	121.40
18	9 33 7.51	16 36 57.2	84.14	18	11 25 14.66	8 10 55.1	121.88
19	9 35 31.42	16 28 29.2	85.21	19	11 27 30.94	7 58 42.4	122.35
20	9 37 55.19	16 19 54.7	86.27	20	11 29 47.08	7 46 26.9	122.81
21	9 40 18.81	16 11 14.0	87.31	21	11 32 3.09	7 34 8.7	123.25
22	9 42 42.28	16 2 27.0	88.35	22	11 34 18.96	7 21 47.9	123.67
23	9 45 5.60	15 53 33.8	89.37	23	11 36 34.70	7 9 24.6	124.08
24	9 47 28.76	N. 15 44 34.6	90.38	24	11 38 50.30	N. 6 56 58.9	124.48



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
FRIDAY 21.				SUNDAY 23.			
0	h m s	N. ° ' "	"	0	h m s	S. ° ' "	"
0	11 38 50.30	N. 6 56 58.9	124.48	0	13 25 39.14	S. 3 21 25.5	128.18
1	11 41 5.78	6 44 30.8	124.88	1	13 27 51.79	3 34 13.9	127.94
2	11 43 21.13	6 32 0.3	125.26	2	13 30 4.46	3 47 0.8	127.70
3	11 45 36.37	6 19 27.7	125.61	3	13 32 17.15	3 59 46.3	127.44
4	11 47 51.48	6 6 53.0	125.96	4	13 34 29.86	4 12 30.1	127.16
5	11 50 6.47	5 54 16.2	126.29	5	13 36 42.60	4 25 12.2	126.88
6	11 52 21.34	5 41 37.5	126.61	6	13 38 55.37	4 37 52.6	126.58
7	11 54 36.11	5 28 56.9	126.92	7	13 41 8.17	4 50 31.2	126.27
8	11 56 50.76	5 16 14.5	127.21	8	13 43 21.01	5 3 7.9	125.96
9	11 59 5.30	5 3 30.4	127.49	9	13 45 33.89	5 15 42.7	125.63
10	12 1 19.74	4 50 44.6	127.76	10	13 47 46.80	5 28 15.4	125.28
11	12 3 34.07	4 37 57.3	128.00	11	13 49 59.76	5 40 46.0	124.92
12	12 5 48.30	4 25 8.6	128.23	12	13 52 12.77	5 53 14.5	124.56
13	12 8 2.44	4 12 18.5	128.46	13	13 54 25.83	6 5 40.7	124.18
14	12 10 16.48	3 59 27.0	128.68	14	13 56 38.94	6 18 4.6	123.78
15	12 12 30.43	3 46 34.3	128.88	15	13 58 52.11	6 30 26.1	123.37
16	12 14 44.29	3 33 40.5	129.07	16	14 1 5.33	6 42 45.1	122.96
17	12 16 58.06	3 20 45.5	129.24	17	14 3 18.62	6 55 1.6	122.53
18	12 19 11.76	3 7 49.6	129.40	18	14 5 31.97	7 7 15.5	122.09
19	12 21 25.37	2 54 52.7	129.55	19	14 7 45.39	7 19 26.7	121.64
20	12 23 38.90	2 41 55.0	129.68	20	14 9 58.88	7 31 35.2	121.18
21	12 25 52.37	2 28 56.6	129.79	21	14 12 12.44	7 43 40.9	120.71
22	12 28 5.76	2 15 57.5	129.91	22	14 14 26.07	7 55 43.7	120.22
23	12 30 19.08	N. 2 2 57.7	130.01	23	14 16 39.78	S. 8 7 43.5	119.73
SATURDAY 22.				MONDAY 24.			
0	12 32 32.34	N. 1 49 57.4	130.08	0	14 18 53.57	S. 8 19 40.4	119.22
1	12 34 45.53	1 36 56.7	130.15	1	14 21 7.44	8 31 34.2	118.69
2	12 36 58.67	1 23 55.6	130.20	2	14 23 21.40	8 43 24.7	118.16
3	12 39 11.75	1 10 54.3	130.24	3	14 25 35.45	8 55 12.1	117.62
4	12 41 24.77	0 57 52.7	130.27	4	14 27 49.58	9 6 56.2	117.07
5	12 43 37.75	0 44 51.0	130.29	5	14 30 3.81	9 18 36.9	116.50
6	12 45 50.68	0 31 49.2	130.29	6	14 32 18.13	9 30 14.2	115.92
7	12 48 3.57	0 18 47.5	130.28	7	14 34 32.55	9 41 48.0	115.34
8	12 50 16.41	N. 0 5 45.8	130.26	8	14 36 47.06	9 53 18.3	114.74
9	12 52 29.22	S. 0 7 15.7	130.23	9	14 39 1.68	10 4 44.9	114.13
10	12 54 42.00	0 20 16.9	130.18	10	14 41 16.40	10 16 7.8	113.51
11	12 56 54.75	0 33 17.8	130.12	11	14 43 31.23	10 27 27.0	112.88
12	12 59 7.47	0 46 18.4	130.05	12	14 45 46.16	10 38 42.3	112.23
13	13 1 20.17	0 59 18.5	129.96	13	14 48 1.20	10 49 53.8	111.58
14	13 3 32.84	1 12 17.9	129.85	14	14 50 16.35	11 1 1.3	110.91
15	13 5 45.50	1 25 16.7	129.75	15	14 52 31.61	11 12 4.7	110.23
16	13 7 58.15	1 38 14.9	129.63	16	14 54 46.99	11 23 4.1	109.55
17	13 10 10.78	1 51 12.2	129.49	17	14 57 2.48	11 33 59.3	108.85
18	13 12 23.40	2 4 8.7	129.34	18	14 59 18.09	11 44 50.3	108.15
19	13 14 36.02	2 17 4.3	129.18	19	15 1 33.82	11 55 37.1	107.43
20	13 16 48.64	2 29 58.8	129.00	20	15 3 49.67	12 6 19.5	106.70
21	13 19 1.26	2 42 52.3	128.82	21	15 6 5.64	12 16 57.5	105.96
22	13 21 13.88	2 55 44.6	128.62	22	15 8 21.73	12 27 31.0	105.21
23	13 23 26.51	3 8 35.7	128.41	23	15 10 37.95	12 38 0.0	104.44
24	13 25 39.14	S. 3 21 25.5	128.18	24	15 12 54.29	S. 12 48 24.3	103.67



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 25.</b>				<b>THURSDAY 27.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
1	15 12 54.29	12 48 24.3	103.67	1	17 4 31.68	19 18 57.1	55.80
2	15 15 10.76	12 58 44.0	102.88	2	17 6 54.07	19 24 28.4	54.62
3	15 17 27.36	13 8 58.9	102.09	3	17 9 16.55	19 29 52.6	53.44
4	15 19 44.09	13 19 9.1	101.29	4	17 11 39.11	19 35 9.7	52.25
5	15 22 0.94	13 29 14.4	100.48	5	17 14 1.75	19 40 19.6	51.05
6	15 24 17.93	13 39 14.8	99.66	6	17 16 24.46	19 45 22.3	49.85
7	15 26 35.05	13 49 10.3	98.83	7	17 18 47.25	19 50 17.8	48.64
8	15 28 52.31	13 59 0.7	97.98	8	17 21 10.11	19 55 6.0	47.43
9	15 31 9.69	14 8 46.0	97.12	9	17 23 33.03	19 59 46.9	46.21
10	15 33 27.21	14 18 26.1	96.26	10	17 25 56.02	20 4 20.5	44.99
11	15 35 44.87	14 28 1.1	95.39	11	17 28 19.07	20 8 46.8	43.77
12	15 38 2.66	14 37 30.8	94.50	12	17 30 42.17	20 13 5.7	42.53
13	15 40 20.58	14 46 55.1	93.61	13	17 33 5.33	20 17 17.2	41.30
14	15 42 38.64	14 56 14.1	92.71	14	17 35 28.54	20 21 21.3	40.07
15	15 44 56.83	15 5 27.6	91.80	15	17 37 51.79	20 25 18.0	38.83
16	15 47 15.16	15 14 35.7	90.88	16	17 40 15.08	20 29 7.2	37.58
17	15 49 33.62	15 23 38.2	89.95	17	17 42 38.41	20 32 48.9	36.33
18	15 51 52.22	15 32 35.1	89.01	18	17 45 1.78	20 36 23.2	35.09
19	15 54 10.96	15 41 26.3	88.06	19	17 47 25.18	20 39 50.0	33.83
20	15 56 29.83	15 50 11.8	87.11	20	17 49 48.61	20 43 9.2	32.57
21	15 58 48.83	15 58 51.6	86.14	21	17 52 12.05	20 46 20.8	31.31
22	16 1 7.97	16 7 25.5	85.16	22	17 54 35.52	20 49 24.9	30.06
23	16 3 27.25	16 15 53.5	84.17	23	17 56 59.00	20 52 21.5	28.80
	16 5 46.65	S. 16 24 15.6	83.18		17 59 22.49	S. 20 55 10.5	27.53
<b>WEDNESDAY 26.</b>				<b>FRIDAY 28.</b>			
0	16 8 6.19	S. 16 32 31.7	82.18	0	18 1 45.99	S. 20 57 51.8	26.26
1	16 10 25.86	16 40 41.8	81.17	1	18 4 9.49	21 0 25.6	24.99
2	16 12 45.66	16 48 45.8	80.15	2	18 6 32.99	21 2 51.7	23.72
3	16 15 5.59	16 56 43.6	79.12	3	18 8 56.48	21 5 10.3	22.46
4	16 17 25.65	17 4 35.2	78.09	4	18 11 19.96	21 7 21.2	21.18
5	16 19 45.84	17 12 20.7	77.05	5	18 13 43.43	21 9 24.5	19.92
6	16 22 6.15	17 19 59.8	75.99	6	18 16 6.88	21 11 20.2	18.65
7	16 24 26.59	17 27 32.6	74.93	7	18 18 30.30	21 13 8.3	17.38
8	16 26 47.15	17 34 59.0	73.86	8	18 20 53.69	21 14 48.7	16.10
9	16 29 7.84	17 42 18.9	72.78	9	18 23 17.05	21 16 21.5	14.83
10	16 31 28.65	17 49 32.4	71.71	10	18 25 40.37	21 17 46.6	13.56
11	16 33 49.57	17 56 39.4	70.62	11	18 28 3.65	21 19 4.2	12.29
12	16 36 10.62	18 3 39.8	69.52	12	18 30 26.89	21 20 14.1	11.02
13	16 38 31.79	18 10 33.6	68.41	13	18 32 50.07	21 21 16.4	9.74
14	16 40 53.06	18 17 20.7	67.29	14	18 35 13.20	21 22 11.0	8.47
15	16 43 14.45	18 24 1.1	66.17	15	18 37 36.27	21 22 58.0	7.21
16	16 45 35.96	18 30 34.8	65.05	16	18 39 59.27	21 23 37.5	5.94
17	16 47 57.57	18 37 1.7	63.92	17	18 42 22.20	21 24 9.3	4.67
18	16 50 19.28	18 43 21.8	62.78	18	18 44 45.06	21 24 33.5	3.41
19	16 52 41.10	18 49 35.1	61.63	19	18 47 7.85	21 24 50.2	2.15
20	16 55 3.02	18 55 41.4	60.48	20	18 49 30.55	21 24 59.3	0.88
21	16 57 25.04	19 1 40.8	59.33	21	18 51 53.16	21 25 0.8	0.38
22	16 59 47.16	19 7 33.3	58.17	22	18 54 15.69	21 24 54.7	1.63
23	17 2 9.37	19 13 18.8	56.98	23	18 56 38.12	21 24 41.2	2.88
	17 4 31.68	S. 19 18 57.1	55.80		18 59 0.45	S. 21 24 20.1	4.14



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 29.</b>				<b>MONDAY 31.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
1	18 59 0.45	21 24 20.1	4.14	1	20 49 38.57	18 49 36.9	57.83
2	19 1 22.68	21 23 51.5	5.39	2	20 51 51.54	18 43 47.1	58.77
3	19 3 44.79	21 23 15.5	6.63	3	20 54 4.26	18 37 51.7	59.70
4	19 6 6.79	21 22 32.0	7.87	4	20 56 16.72	18 31 50.7	60.62
5	19 8 28.68	21 21 41.1	9.10	5	20 58 28.93	18 25 44.3	61.52
6	19 10 50.45	21 20 42.8	10.33	6	21 0 40.87	18 19 32.5	62.42
7	19 13 12.09	21 19 37.1	11.57	7	21 2 52.56	18 13 15.2	63.32
8	19 15 33.60	21 18 24.0	12.79	8	21 5 3.99	18 6 52.6	64.20
9	19 17 54.97	21 17 3.6	14.02	9	21 7 15.15	18 0 24.8	65.07
10	19 20 16.21	21 15 35.8	15.23	10	21 9 26.06	17 53 51.8	65.93
11	19 22 37.31	21 14 0.8	16.44	11	21 11 36.70	17 47 13.6	66.79
12	19 24 58.26	21 12 18.5	17.65	12	21 13 47.08	17 40 30.3	67.63
13	19 27 19.05	21 10 29.0	18.85	13	21 15 57.19	17 33 42.0	68.47
14	19 29 39.69	21 8 32.3	20.05	14	21 18 7.04	17 26 48.7	69.30
15	19 32 0.18	21 6 28.4	21.25	15	21 20 16.63	17 19 50.4	70.12
16	19 34 20.50	21 4 17.3	22.43	16	21 22 25.96	17 12 47.3	70.93
17	19 36 40.66	21 1 59.2	23.61	17	21 24 35.02	17 5 39.3	71.73
18	19 39 0.64	20 59 34.0	24.79	18	21 26 43.81	16 58 26.5	72.52
19	19 41 20.45	20 57 1.7	25.97	19	21 28 52.34	16 51 9.0	73.30
20	19 43 40.09	20 54 22.4	27.13	20	21 31 0.61	16 43 46.9	74.07
21	19 45 59.55	20 51 36.1	28.29	21	21 33 8.61	16 36 20.2	74.83
22	19 48 18.82	20 48 42.9	29.44	22	21 35 16.35	16 28 48.9	75.59
23	19 50 37.90	20 45 42.8	30.58	23	21 37 23.82	16 21 13.1	76.33
24	19 52 56.79	S. 20 42 35.9	31.73	24	21 39 31.02	S. 16 13 32.9	77.06
<b>SUNDAY 30.</b>				<b>TUESDAY, FEB. 1.</b>			
0	19 55 15.49	S. 20 39 22.1	32.87	0	21 41 37.96	S. 16 5 48.4	77.78
1	19 57 33.99	20 36 1.5	33.99				
2	19 59 52.29	20 32 34.2	35.11				
3	20 2 10.39	20 29 0.2	36.22				
4	20 4 28.27	20 25 19.5	37.33				
5	20 6 45.95	20 21 32.2	38.43				
6	20 9 3.42	20 17 38.3	39.53				
7	20 11 20.67	20 13 37.9	40.61				
8	20 13 37.70	20 9 31.0	41.69				
9	20 15 54.51	20 5 17.6	42.76				
10	20 18 11.09	20 0 57.9	43.82				
11	20 20 27.45	19 56 31.8	44.87				
12	20 22 43.59	19 51 59.4	45.92				
13	20 24 59.49	19 47 20.8	46.96				
14	20 27 15.16	19 42 35.9	47.99				
15	20 29 30.59	19 37 44.9	49.01				
16	20 31 45.79	19 32 47.8	50.02				
17	20 34 0.75	19 27 44.6	51.03				
18	20 36 15.46	19 22 35.4	52.03				
19	20 38 29.93	19 17 20.3	53.02				
20	20 40 44.16	19 11 59.2	54.00				
21	20 42 58.14	19 6 32.3	54.97				
22	20 45 11.87	19 0 59.6	55.93				
23	20 47 25.35	18 55 21.1	56.89				
24	20 49 38.57	S. 18 49 36.9	57.83				

## PHASES OF THE MOON.

Jan. 1	● New Moon	- - 12 5.4
9	☾ First Quarter	- 9 2.2
17	○ Full Moon	- - 2 45.2
23	☾ Last Quarter	- 22 22.9
31	● New Moon	- - 3 40.6

Jan. 9	☾ Apogee	- - - - - 0
21	☾ Perigee	- - - - - 2



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
4	SUN W.	30 13 38	3112	31 41 33	3126	33 9 11	3140	34 36 32	3154
	$\alpha$ Pegasi E.	42 16 15	3726	40 59 56	3805	39 44 59	3891	38 31 30	3985
	$\alpha$ Arietis E.	82 1 38	2904	80 29 24	2919	78 57 29	2934	77 25 53	2950
	Jupiter E.	86 45 59	2757	85 10 34	2770	83 35 27	2783	82 0 37	2797
	Aldebaran E.	113 30 15	2747	111 54 38	2761	110 19 19	2774	108 44 17	2787
5	SUN W.	41 49 7	3223	43 14 49	3236	44 40 15	3249	46 5 26	3262
	$\alpha$ Pegasi E.	32 50 29	4638	31 48 37	4820	30 49 17	5023	29 52 40	5257
	$\alpha$ Arietis E.	69 52 48	3028	68 23 10	3044	66 53 52	3061	65 24 55	3078
	Jupiter E.	74 10 50	2863	72 37 43	2876	71 4 53	2888	69 32 19	2900
	Aldebaran E.	100 53 24	2852	99 20 3	2864	97 46 58	2876	96 14 9	2887
6	SUN W.	53 7 42	3322	54 31 28	3333	55 55 1	3344	57 18 22	3354
	$\alpha$ Arietis E.	58 5 16	3164	56 38 24	3182	55 11 53	3200	53 45 44	3219
	Jupiter E.	61 53 17	2959	60 22 13	2970	58 51 22	2980	57 20 44	2991
	Aldebaran E.	88 33 43	2944	87 2 20	2954	85 31 10	2964	84 0 12	2974
7	SUN W.	64 12 16	3400	65 34 32	3408	66 56 40	3416	68 18 39	3423
	Venus W.	20 5 53	3332	21 29 27	3335	22 52 58	3337	24 16 26	3339
	$\alpha$ Arietis E.	46 40 52	3324	45 17 8	3348	43 53 52	3373	42 31 5	3400
	Jupiter E.	49 50 41	3037	48 21 14	3045	46 51 57	3054	45 22 51	3061
	Aldebaran E.	76 28 13	3016	74 58 20	3023	73 28 36	3030	71 59 1	3037
8	SUN W.	75 6 46	3450	76 28 6	3454	77 49 22	3457	79 10 34	3461
	Fomalhaut W.	34 19 37	3822	35 34 17	3772	36 49 48	3728	38 6 6	3688
	Venus W.	31 13 0	3352	32 36 11	3355	33 59 19	3356	35 22 26	3358
	$\alpha$ Arietis E.	35 45 27	3567	34 26 17	3610	33 7 54	3659	31 50 23	3713
	Jupiter E.	37 59 33	3096	36 31 18	3102	35 3 11	3107	33 35 10	3114
	Aldebaran E.	64 32 53	3063	63 3 58	3066	61 35 6	3069	60 6 19	3072
	Pollux E.	108 40 38	3099	107 12 27	3103	105 44 21	3105	104 16 18	3108
9	SUN W.	85 55 56	3467	87 16 57	3467	88 37 58	3465	89 59 1	3464
	Fomalhaut W.	44 36 53	3539	45 56 34	3517	47 16 40	3496	48 37 9	3475
	Venus W.	42 17 51	3356	43 40 58	3354	45 4 7	3352	46 27 18	3350
	$\alpha$ Pegasi W.	33 37 15	4623	34 39 20	4508	35 43 5	4407	36 48 20	4316
	Aldebaran E.	52 43 1	3078	51 14 25	3078	49 45 49	3078	48 17 12	3076
	Pollux E.	96 56 33	3112	95 28 38	3111	94 0 42	3111	92 32 46	3109
10	SUN W.	96 44 51	3448	98 6 13	3444	99 27 40	3438	100 49 13	3432
	Fomalhaut W.	55 24 50	3390	56 47 18	3374	58 10 5	3359	59 33 8	3345
	Venus W.	53 24 11	3329	54 47 49	3324	56 11 33	3317	57 35 25	3311
	$\alpha$ Pegasi W.	42 33 21	3971	43 45 29	3919	44 58 29	3870	46 12 19	3824
	Aldebaran E.	40 53 32	3063	39 24 37	3059	37 55 37	3055	36 26 32	3049
	Pollux E.	85 12 26	3096	83 44 11	3092	82 15 51	3087	80 47 26	3082
11	SUN W.	107 38 48	3396	109 1 9	3387	110 23 40	3378	111 46 21	3369
	Fomalhaut W.	66 32 30	3275	67 57 11	3262	69 22 7	3248	70 47 20	3235
	Venus W.	64 36 49	3270	66 1 35	3261	67 26 32	3251	68 51 41	3241
	$\alpha$ Pegasi W.	52 32 17	3537	53 50 11	3505	55 8 40	3576	56 27 40	3547
	Aldebaran E.	28 59 21	3018	27 29 30	3010	25 59 30	3003	24 29 21	2995
	Pollux E.	73 23 36	3051	71 54 27	3043	70 25 8	3036	68 55 40	3028
	Regulus E.	109 7 44	3015	107 37 50	3008	106 7 47	2999	104 37 33	2990
12	SUN W.	118 42 46	3313	120 6 42	3301	121 30 52	3288	122 55 17	3276



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4	SUN W.	36 3 36	3168	37 30 24	3183	38 56 54	3196	40 23 8	3209
	α Pegasi E.	37 19 36	4090	36 9 25	4205	35 1 4	4333	33 54 42	4477
	α Arietis E.	75 54 37	2965	74 23 40	2981	72 53 3	2996	71 22 45	3013
	Jupiter E.	80 26 5	2810	78 51 50	2824	77 17 53	2837	75 44 13	2850
	Aldebaran E.	107 9 32	2801	105 35 5	2814	104 0 55	2826	102 27 1	2839
5	SUN W.	47 30 22	3275	48 55 3	3287	50 19 30	3299	51 43 43	3311
	α Pegasi E.	28 59 1	5525	28 8 35	5835	27 21 37	6194	26 38 23	6614
	α Arietis E.	63 56 18	3094	62 28 1	3111	61 0 5	3128	59 32 30	3146
	Jupiter E.	68 0 0	2912	66 27 57	2924	64 56 9	2936	63 24 36	2947
	Aldebaran E.	94 41 34	2900	93 9 15	2912	91 37 11	2922	90 5 20	2933
6	SUN W.	58 41 31	3365	60 4 28	3374	61 27 14	3383	62 49 50	3394
	α Arietis E.	52 19 58	3239	50 54 35	3259	49 29 36	3280	48 5 1	3302
	Jupiter E.	55 50 20	3000	54 20 7	3010	52 50 7	3019	51 20 18	3029
	Aldebaran E.	82 29 26	2982	80 58 51	2992	79 28 28	3001	77 58 16	3008
7	SUN W.	69 40 30	3430	71 2 13	3435	72 23 50	3440	73 45 21	3446
	Venus W.	25 39 52	3343	27 3 14	3346	28 26 32	3348	29 49 48	3351
	α Arietis E.	41 8 48	3429	39 47 4	3459	38 25 54	3482	37 5 21	3528
	Jupiter E.	43 53 54	3069	42 25 6	3076	40 56 27	3083	39 27 56	3089
	Aldebaran E.	70 29 34	3043	69 0 14	3048	67 31 1	3053	66 1 54	3058
8	SUN W.	80 31 42	3463	81 52 48	3465	83 13 52	3466	84 34 54	3466
	Fomalhaut W.	39 23 6	3652	40 40 44	3620	41 58 56	3591	43 17 40	3564
	Venus W.	36 45 31	3358	38 8 36	3358	39 31 41	3358	40 54 45	3357
	α Arietis E.	30 33 50	3774	29 18 21	3844	28 4 4	3924	26 51 8	4015
	Jupiter E.	32 7 17	3119	30 39 30	3124	29 11 50	3130	27 44 17	3136
	Aldebaran E.	58 37 35	3074	57 8 54	3076	55 40 15	3078	54 11 38	3078
	Pollux E.	102 48 18	3109	101 20 20	3110	99 52 23	3112	98 24 28	3112
9	SUN W.	91 20 5	3462	92 41 12	3460	94 2 21	3456	95 23 34	3453
	Fomalhaut W.	49 58 1	3456	51 19 14	3439	52 40 47	3422	54 2 39	3405
	Venus W.	47 50 32	3346	49 13 50	3343	50 37 12	3339	52 0 39	3334
	α Pegasi W.	37 54 58	4234	39 2 52	4158	40 11 58	4090	41 22 9	4028
	Aldebaran E.	46 48 33	3075	45 19 53	3072	43 51 9	3069	42 22 23	3066
	Pollux E.	91 4 47	3108	89 36 47	3105	88 8 44	3102	86 40 37	3099
10	SUN W.	102 10 53	3426	103 32 40	3420	104 54 34	3413	106 16 36	3404
	Fomalhaut W.	60 56 28	3331	62 20 4	3316	63 43 57	3302	65 8 6	3289
	Venus W.	58 59 24	3303	60 23 32	3296	61 47 48	3288	63 12 13	3279
	α Pegasi W.	47 26 56	3782	48 42 17	3743	49 58 18	3706	51 14 59	3671
	Aldebaran E.	34 57 20	3043	33 28 1	3038	31 58 36	3031	30 29 2	3025
	Pollux E.	79 18 54	3077	77 50 16	3070	76 21 30	3064	74 52 37	3058
11	SUN W.	113 9 13	3358	114 32 18	3348	115 55 34	3337	117 19 3	3325
	Fomalhaut W.	72 12 48	3221	73 38 32	3208	75 4 32	3194	76 30 48	3181
	Venus W.	70 17 1	3230	71 42 35	3219	73 8 21	3208	74 34 21	3195
	α Pegasi W.	57 47 13	3519	59 7 16	3493	60 27 48	3467	61 48 49	3443
	Aldebaran E.	22 59 2	2986	21 28 32	2978	19 57 52	2970	18 27 1	2962
	Pollux E.	67 26 2	3019	65 56 13	3011	64 26 14	3002	62 56 3	2993
	Regulus E.	103 7 8	2981	101 36 31	2971	100 5 42	2961	98 34 40	2950
12	SUN W.	124 19 56	3262	125 44 52	3249	127 10 3	3236	128 35 30	3221



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12	Fomalhaut W.	77 57 20	3167	79 24 9	3154	80 51 13	3140	82 18 34	3128	
	Venus W.	76 0 36	3184	77 27 4	3171	78 53 48	3158	80 20 48	3145	
	α Pegasi W.	63 10 17	3418	64 32 13	3395	65 54 35	3372	67 17 23	3351	
	α Arietis W.	21 9 38	4457	22 14 8	4257	23 21 41	4088	24 31 54	3944	
	Pollux E.	61 25 41	2983	59 55 7	2973	58 24 21	2964	56 53 23	2954	
	Regulus E.	97 3 25	2939	95 31 56	2929	94 0 14	2917	92 28 16	2905	
13	Sun W.	130 1 14	3206	131 27 16	3192	132 53 35	3177	134 20 11	3162	
	Fomalhaut W.	89 39 21	3061	91 8 19	3047	92 37 34	3034	94 7 5	3021	
	Venus W.	87 39 52	3074	89 8 33	3060	90 37 32	3044	92 6 50	3029	
	α Pegasi W.	74 17 31	3248	75 42 43	3229	77 8 18	3210	78 34 15	3193	
	α Arietis W.	30 53 31	3466	32 14 33	3400	33 36 49	3342	35 0 12	3288	
	Jupiter W.	22 26 21	2922	23 58 12	2900	25 30 31	2880	27 3 16	2860	
	Pollux E.	49 15 18	2902	47 43 2	2891	46 10 32	2882	44 37 50	2872	
	Regulus E.	84 44 36	2842	83 11 3	2828	81 37 12	2814	80 3 3	2801	
14	Venus W.	99 38 6	2951	101 9 20	2935	102 40 54	2920	104 12 48	2903	
	α Pegasi W.	85 49 16	3108	87 17 16	3092	88 45 36	3077	90 14 14	3062	
	α Arietis W.	42 11 24	3075	43 40 4	3040	45 9 27	3008	46 39 30	2977	
	Jupiter W.	34 53 4	2770	36 28 11	2753	38 3 40	2737	39 39 31	2720	
	Pollux E.	36 51 20	2830	35 17 31	2824	33 43 34	2819	32 9 30	2816	
	Regulus E.	72 7 45	2729	70 31 44	2716	68 55 25	2701	67 18 46	2686	
15	Venus W.	111 57 21	2825	113 31 16	2809	115 5 32	2795	116 40 7	2779	
	α Pegasi W.	97 41 41	2998	99 11 56	2986	100 42 26	2976	102 13 8	2967	
	α Arietis W.	54 18 53	2843	55 52 25	2820	57 26 27	2797	59 0 59	2775	
	Jupiter W.	47 44 11	2641	49 22 10	2625	51 0 31	2610	52 39 13	2595	
	Aldebaran W.	21 4 35	2618	22 43 5	2602	24 21 57	2587	26 1 10	2572	
	Regulus E.	59 10 35	2613	57 31 58	2599	55 53 1	2585	54 13 45	2570	
	Spica E.	112 58 26	2650	111 20 39	2635	109 42 31	2619	108 4 2	2604	
16	α Arietis W.	67 0 30	2677	68 37 41	2660	70 15 15	2643	71 53 11	2627	
	Jupiter W.	60 57 44	2522	62 38 26	2509	64 19 27	2496	66 0 46	2482	
	Aldebaran W.	34 22 23	2500	36 3 36	2486	37 45 9	2472	39 27 1	2460	
	Regulus E.	45 52 33	2502	44 11 22	2489	42 29 53	2477	40 48 7	2464	
	Spica E.	99 46 34	2532	98 6 5	2518	96 25 17	2505	94 44 11	2492	
17	α Arietis W.	80 8 9	2556	81 48 5	2543	83 28 19	2531	85 8 49	2520	
	Jupiter W.	74 31 50	2421	76 14 54	2410	77 58 14	2400	79 41 49	2390	
	Aldebaran W.	48 0 49	2398	49 44 26	2387	51 28 19	2377	53 12 27	2366	
	Regulus E.	32 15 1	2408	30 31 37	2398	28 47 59	2389	27 4 8	2380	
	Spica E.	86 14 14	2432	84 31 25	2421	82 48 21	2410	81 5 1	2400	
18	α Arietis W.	93 34 57	2474	95 16 47	2467	96 58 47	2460	98 40 57	2455	
	Jupiter W.	88 23 16	2343	90 8 13	2336	91 53 20	2328	93 38 39	2321	
	Aldebaran W.	61 56 45	2320	63 42 16	2312	65 27 58	2304	67 13 52	2296	
	Pollux W.	19 2 38	2645	20 40 32	2588	22 19 43	2541	23 59 59	2503	
	Spica E.	72 25 0	2357	70 40 24	2350	68 55 38	2343	67 10 41	2337	
	Antares E.	118 16 12	2381	116 32 10	2371	114 47 53	2362	113 3 23	2353	
19	Jupiter W.	102 27 36	2292	104 13 47	2287	106 0 5	2283	107 46 29	2280	
	Aldebaran W.	76 5 51	2266	77 52 40	2262	79 39 36	2257	81 26 39	2253	
	Pollux W.	32 32 12	2384	34 16 10	2369	36 0 30	2355	37 45 10	2343	



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12	Fomalhaut W.	83 46 10	3114	85 14 3	3100	86 42 13	3087	88 10 39	3074
	Venus W.	81 48 3	3131	83 15 35	3117	84 43 24	3104	86 11 29	3089
	α Pegasi W.	68 40 36	3329	70 4 14	3308	71 28 16	3288	72 52 42	3268
	α Arietis W.	25 44 29	3821	26 59 9	3715	28 15 40	3622	29 33 51	3540
	Pollux E.	55 22 12	2943	53 50 48	2933	52 19 11	2923	50 47 21	2913
	Regulus E.	90 56 4	2893	89 23 36	2881	87 50 53	2868	86 17 53	2855
13	Sun W.	135 47 5	3147	137 14 18	3131	138 41 50	3116	140 9 40	3100
	Fomalhaut W.	95 36 52	3009	97 6 54	2995	98 37 13	2983	100 7 47	2971
	Venus W.	93 36 27	3014	95 6 23	2999	96 36 37	2982	98 7 12	2967
	α Pegasi W.	80 0 33	3174	81 27 13	3157	82 54 14	3140	84 21 35	3124
	α Arietis W.	36 24 38	3238	37 50 2	3193	39 16 20	3151	40 43 28	3111
	Jupiter W.	28 36 26	2841	30 10 0	2822	31 43 59	2805	33 18 20	2788
	Pollux E.	43 4 55	2863	41 31 48	2854	39 58 30	2845	38 25 0	2837
	Regulus E.	78 28 36	2788	76 53 52	2773	75 18 48	2759	73 43 26	2744
14	Venus W.	105 45 3	2888	107 17 37	2873	108 50 31	2856	110 23 46	2841
	α Pegasi W.	91 43 10	3048	93 12 23	3035	94 41 53	3022	96 11 39	3009
	α Arietis W.	48 10 12	2947	49 41 31	2920	51 13 25	2893	52 45 53	2868
	Jupiter W.	41 15 44	2704	42 52 19	2688	44 29 15	2673	46 6 32	2656
	Pollux E.	30 35 23	2814	29 1 13	2815	27 27 5	2820	25 53 3	2828
	Regulus E.	65 41 47	2671	64 4 28	2657	62 26 50	2643	60 48 53	2627
15	Venus W.	118 15 2	2765	119 50 16	2750	121 25 50	2736	123 1 42	2722
	α Pegasi W.	103 44 2	2958	105 15 7	2951	106 46 21	2944	108 17 44	2939
	α Arietis W.	60 36 0	2754	62 11 28	2734	63 47 23	2714	65 23 44	2695
	Jupiter W.	54 18 15	2580	55 57 37	2565	57 37 20	2551	59 17 22	2537
	Aldebaran W.	27 40 44	2556	29 20 39	2542	31 0 53	2527	32 41 28	2513
	Regulus E.	52 34 9	2556	50 54 13	2543	49 13 59	2528	47 33 25	2515
	Spica E.	106 25 13	2589	104 46 3	2574	103 6 33	2560	101 26 43	2546
16	α Arietis W.	73 31 30	2611	75 10 10	2596	76 49 10	2582	78 28 30	2568
	Jupiter W.	67 42 24	2470	69 24 19	2457	71 6 33	2445	72 49 3	2433
	Aldebaran W.	41 9 11	2446	42 51 40	2434	44 34 26	2422	46 17 29	2410
	Regulus E.	39 6 3	2451	37 23 41	2440	35 41 4	2429	33 58 10	2418
	Spica E.	93 2 46	2479	91 21 4	2467	89 39 4	2455	87 56 47	2443
17	α Arietis W.	86 49 35	2509	88 30 36	2499	90 11 50	2490	91 53 17	2481
	Jupiter W.	81 25 38	2380	83 9 42	2370	84 54 0	2360	86 38 32	2352
	Aldebaran W.	54 56 51	2356	56 41 29	2346	58 26 21	2337	60 11 26	2328
	Regulus E.	25 20 5	2372	23 35 50	2365	21 51 25	2359	20 6 52	2355
	Spica E.	79 21 27	2391	77 37 39	2382	75 53 39	2373	74 9 25	2365
18	α Arietis W.	100 23 14	2449	102 5 39	2445	103 48 10	2441	105 30 46	2438
	Jupiter W.	95 24 8	2314	97 9 47	2308	98 55 35	2302	100 41 32	2297
	Aldebaran W.	68 59 57	2289	70 46 12	2283	72 32 36	2277	74 19 9	2271
	Pollux W.	25 41 8	2471	27 23 2	2444	29 5 34	2421	30 48 39	2401
	Spica E.	65 25 36	2332	63 40 23	2326	61 55 2	2322	60 9 35	2318
	Antares E.	111 18 40	2345	109 33 46	2337	107 48 40	2330	106 3 24	2323
19	Jupiter W.	109 32 58	2277	111 19 32	2274	113 6 9	2272	114 52 50	2271
	Aldebaran W.	83 13 48	2249	85 1 2	2247	86 48 20	2243	88 35 43	2241
	Pollux W.	39 30 6	2333	41 15 17	2324	43 0 41	2317	44 46 16	2310



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19	Spica E.	58 24 1	2315	56 38 23	2313	54 52 42	2310	53 6 57	2309
	Antares E.	104 17 58	2317	102 32 23	2312	100 46 41	2307	99 0 51	2302
	Saturn E.	120 9 30	2300	118 23 30	2294	116 37 22	2289	114 51 7	2286
20	Aldebaran W.	90 23 9	2239	92 10 38	2238	93 58 9	2237	95 45 42	2235
	Pollux W.	46 32 1	2303	48 17 56	2298	50 3 58	2294	51 50 6	2290
	Spica E.	44 18 4	2313	42 32 24	2317	40 46 50	2322	39 1 23	2328
	Antares E.	90 10 19	2287	88 24 1	2286	86 37 41	2285	84 51 19	2285
	Saturn E.	105 58 37	2272	104 11 56	2270	102 25 12	2268	100 38 26	2268
	SUN E.	142 7 48	2557	140 27 54	2554	138 47 56	2553	137 7 56	2552
21	Pollux W.	60 41 51	2281	62 28 18	2280	64 14 47	2281	66 1 15	2281
	Regulus W.	24 38 2	2251	26 25 13	2251	28 12 25	2251	29 59 37	2251
	Spica E.	30 17 6	2386	28 33 11	2405	26 49 43	2429	25 6 49	2458
	Antares E.	75 59 31	2288	74 13 14	2290	72 26 59	2293	70 40 49	2296
	Saturn E.	91 44 27	2268	89 57 40	2269	88 10 55	2270	86 24 12	2272
	SUN E.	128 47 49	2553	127 7 50	2554	125 27 52	2556	123 47 56	2557
22	Pollux W.	74 53 14	2289	76 39 29	2291	78 25 41	2294	80 11 49	2298
	Regulus W.	38 55 18	2259	40 42 18	2262	42 29 14	2264	44 16 6	2267
	Antares E.	61 51 12	2316	60 5 36	2322	58 20 9	2327	56 34 49	2334
	Saturn E.	77 31 22	2285	75 45 0	2288	73 58 42	2291	72 12 29	2294
	SUN E.	115 29 0	2571	113 49 25	2574	112 9 54	2577	110 30 28	2582
23	Pollux W.	89 1 12	2317	90 46 47	2321	92 32 16	2326	94 17 37	2331
	Regulus W.	53 9 11	2286	54 55 31	2290	56 41 45	2295	58 27 52	2300
	Antares E.	47 50 49	2375	46 6 38	2385	44 22 42	2396	42 39 1	2408
	Saturn E.	63 22 47	2315	61 37 10	2319	59 51 38	2324	58 6 14	2328
	SUN E.	102 14 42	2603	100 35 51	2607	98 57 6	2613	97 18 29	2618
24	Pollux W.	103 2 34	2357	104 47 10	2364	106 31 36	2369	108 15 55	2376
	Regulus W.	67 16 44	2324	69 2 8	2329	70 47 25	2335	72 32 34	2340
	Spica W.	15 5 13	2850	16 38 36	2757	18 14 1	2689	19 50 56	2638
	Antares E.	34 5 32	2490	32 24 4	2512	30 43 7	2537	29 2 45	2566
	Saturn E.	49 21 0	2355	47 36 20	2360	45 51 48	2366	44 7 24	2372
	SUN E.	89 7 7	2645	87 29 13	2651	85 51 27	2656	84 13 48	2663
25	Regulus W.	81 16 22	2368	83 0 43	2373	84 44 56	2380	86 29 0	2385
	Spica W.	28 8 1	2520	29 48 47	2510	31 29 47	2503	33 10 56	2497
	Saturn E.	35 27 30	2401	33 43 57	2408	32 0 34	2415	30 17 20	2421
	SUN E.	76 7 37	2692	74 30 47	2699	72 54 6	2705	71 17 33	2712
26	Regulus W.	95 7 13	2416	96 50 25	2422	98 33 29	2429	100 16 23	2435
	Spica W.	41 37 56	2491	43 19 22	2492	45 0 46	2494	46 42 8	2497
	SUN E.	63 16 59	2745	61 41 19	2751	60 5 47	2759	58 30 25	2766
27	Spica W.	55 7 47	2516	56 48 38	2521	58 29 22	2526	60 9 59	2532
	Antares W.	12 2 53	3839	13 17 15	3537	14 36 58	3325	16 0 40	3174
	SUN E.	50 35 52	2801	49 1 25	2809	47 27 9	2816	45 53 2	2824
28	Spica W.	68 31 5	2562	70 10 52	2569	71 50 30	2575	73 29 59	2582
	Antares W.	23 31 54	2831	25 5 42	2802	26 40 8	2779	28 15 3	2762
	SUN E.	38 5 0	2863	36 31 54	2872	34 59 0	2880	33 26 16	2890



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
19	Spica E.	51 21 10	2308	49 35 22	2308	47 49 34	2309	46 3 48	2311
	Antares E.	97 14 55	2298	95 28 53	2295	93 42 46	2292	91 56 34	2289
	Saturn E.	113 4 47	2282	111 18 21	2279	109 31 50	2276	107 45 16	2273
20	Aldebaran W.	97 33 17	2235	99 20 52	2235	101 8 28	2235	102 56 3	2236
	Pollux W.	53 36 20	2287	55 22 38	2285	57 9 0	2283	58 55 24	2281
	Spica E.	37 16 5	2236	35 30 57	2245	33 46 3	2356	32 1 25	2369
	Antares E.	83 4 57	2284	81 18 34	2285	79 32 12	2285	77 45 50	2287
	Saturn E.	98 51 39	2267	97 4 51	2266	95 18 2	2267	93 31 14	2268
	SUN E.	135 27 55	2552	133 47 54	2551	132 7 52	2551	130 27 50	2552
21	Pollux W.	67 47 42	2282	69 34 8	2283	71 20 33	2285	73 6 55	2287
	Regulus W.	31 46 49	2252	33 34 0	2253	35 21 8	2254	37 8 15	2257
	Spica E.	23 24 36	2494	21 43 14	2539	20 2 55	2596	18 23 55	2672
	Antares E.	68 54 43	2298	67 8 41	2302	65 22 45	2306	63 36 55	2311
	Saturn E.	84 37 32	2274	82 50 54	2276	81 4 20	2278	79 17 49	2281
	SUN E.	122 8 2	2559	120 28 11	2562	118 48 24	2564	117 8 40	2567
22	Pollux W.	81 57 52	2300	83 43 51	2304	85 29 44	2309	87 15 31	2313
	Regulus W.	46 2 54	2271	47 49 36	2274	49 36 14	2278	51 22 45	2282
	Antares E.	54 49 40	2341	53 4 40	2348	51 19 51	2357	49 35 14	2365
	Saturn E.	70 26 21	2298	68 40 19	2302	66 54 22	2306	65 8 32	2310
	SUN E.	108 51 8	2585	107 11 52	2590	105 32 43	2594	103 53 39	2599
23	Pollux W.	96 2 52	2336	97 47 59	2341	99 32 59	2347	101 17 50	2352
	Regulus W.	60 13 52	2304	61 59 46	2309	63 45 32	2314	65 31 11	2318
	Antares E.	40 55 38	2421	39 12 34	2435	37 29 50	2451	35 47 28	2470
	Saturn E.	56 20 56	2334	54 35 46	2339	52 50 43	2344	51 5 48	2349
	SUN E.	95 39 58	2623	94 1 34	2629	92 23 18	2634	90 45 9	2639
24	Pollux W.	110 0 4	2382	111 44 4	2389	113 27 54	2396	115 11 35	2403
	Regulus W.	74 17 36	2346	76 2 29	2351	77 47 15	2357	79 31 52	2362
	Spica W.	21 28 59	2600	23 7 54	2571	24 47 28	2549	26 27 33	2533
	Antares E.	27 23 4	2601	25 44 11	2642	24 6 13	2690	22 29 20	2750
	Saturn E.	42 23 9	2377	40 39 1	2383	38 55 2	2389	37 11 12	2395
	SUN E.	82 36 18	2669	80 58 56	2674	79 21 41	2680	77 44 35	2686
25	Regulus W.	88 12 56	2391	89 56 43	2397	91 40 22	2403	93 23 52	2410
	Spica W.	34 52 14	2493	36 33 37	2491	38 15 2	2490	39 56 29	2490
	Saturn E.	28 34 15	2428	26 51 20	2436	25 8 36	2443	23 26 2	2450
	SUN E.	69 41 9	2719	68 4 54	2725	66 28 47	2731	64 52 49	2738
26	Regulus W.	101 59 8	2441	103 41 44	2448	105 24 11	2455	107 6 28	2461
	Spica W.	48 23 25	2500	50 4 38	2503	51 45 47	2507	53 26 50	2512
	SUN E.	56 55 12	2772	55 20 8	2779	53 45 13	2786	52 10 27	2794
27	Spica W.	61 50 28	2537	63 30 50	2543	65 11 3	2549	66 51 8	2555
	Antares W.	17 27 21	3063	18 56 16	2979	20 26 55	2916	21 58 54	2868
	SUN E.	44 19 5	2832	42 45 18	2840	41 11 42	2848	39 38 16	2855
28	Spica W.	75 9 18	2590	76 48 27	2598	78 27 25	2604	80 6 14	2612
	Antares W.	29 50 21	2749	31 25 56	2739	33 1 44	2732	34 37 41	2747
	SUN E.	31 53 44	2898	30 21 23	2907	28 49 13	2916	27 17 15	2926



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time. of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1° 32784	1° 65356	9° 95986	1° 47678	71° 664	<sup>h</sup> <sup>m</sup> <sup>s</sup> 5 15 23·75
2	1° 32114	1° 65285	9° 96148	1° 47656	72° 078	5 11 27·83
3	1° 31435	1° 65206	9° 96308	1° 47633	72° 500	5 7 31·92
4	1° 30748	1° 65120	9° 96468	1° 47609	72° 930	5 3 36·01
5	1° 30053	1° 65029	9° 96626	1° 47584	73° 367	4 59 40·10
6	1° 29349	1° 64931	9° 96782	1° 47558	73° 810	4 55 44·19
7	1° 28639	1° 64827	9° 96939	1° 47531	74° 258	4 51 48·28
8	1° 27921	1° 64717	9° 97094	1° 47503	74° 714	4 47 52·37
9	1° 27195	1° 64600	9° 97246	1° 47474	75° 177	4 43 56·46
10	1° 26462	1° 64477	9° 97396	1° 47444	75° 646	4 40 0·54
11	1° 25721	1° 64348	9° 97546	1° 47414	76° 120	4 36 4·63
12	1° 24973	1° 64213	9° 97694	1° 47383	76° 599	4 32 8·72
13	1° 24218	1° 64071	9° 97841	1° 47351	77° 084	4 28 12·81
14	1° 23456	1° 63923	9° 97986	1° 47318	77° 574	4 24 16·90
15	1° 22686	1° 63768	9° 98130	1° 47285	78° 070	4 20 20·99
16	1° 21909	1° 63608	9° 98272	1° 47251	78° 571	4 16 25·08
17	1° 21125	1° 63441	9° 98412	1° 47217	79° 076	4 12 29·17
18	1° 20334	1° 63267	9° 98551	1° 47182	79° 587	4 8 33·26
19	1° 19538	1° 63087	9° 98688	1° 47146	80° 101	4 4 37·35
20	1° 18735	1° 62900	9° 98823	1° 47110	80° 620	4 0 41·44
21	1° 17925	1° 62707	9° 98957	1° 47073	81° 143	3 56 45·53
22	1° 17109	1° 62508	9° 99089	1° 47036	81° 669	3 52 49·61
23	1° 16287	1° 62301	9° 99220	1° 46998	82° 200	3 48 53·70
24	1° 15459	1° 62089	9° 99349	1° 46960	82° 733	3 44 57·79
25	1° 14627	1° 61871	9° 99476	1° 46922	83° 269	3 41 1·88
26	1° 13788	1° 61646	9° 99601	1° 46883	83° 809	3 37 5·97
27	1° 12944	1° 61413	9° 99725	1° 46844	84° 351	3 33 10·06
28	1° 12097	1° 61174	9° 99847	1° 46805	84° 896	3 29 14·15
29	1° 11245	1° 60929	9° 99967	1° 46765	85° 444	3 25 18·24
30	1° 10389	1° 60677	0° 00086	1° 46725	85° 993	3 21 22·33
31	1° 09529	1° 60419	0° 00203	1° 46685	86° 545	3 17 26·43
32	1° 08666	1° 60154	0° 00318	1° 46645	87° 098	3 13 30·52



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>d</sup> . 027465.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D		Days.		
1	—0 <sup>o</sup> .5712	+1 <sup>o</sup> .3019	—9 <sup>o</sup> .4598	+0 <sup>o</sup> .6970	2404064	285	0	0000
2	0 <sup>o</sup> .6077	1 <sup>o</sup> .3002	9 <sup>o</sup> .4547	0 <sup>o</sup> .6956	2404065	286	1	0027
3	0 <sup>o</sup> .6412	1 <sup>o</sup> .2984	9 <sup>o</sup> .4494	0 <sup>o</sup> .6942	2404066	287	2	0055
4	—0 <sup>o</sup> .6722	+1 <sup>o</sup> .2965	—9 <sup>o</sup> .4442	+0 <sup>o</sup> .6927	2404067	288	3	0082
5	0 <sup>o</sup> .7010	1 <sup>o</sup> .2944	9 <sup>o</sup> .4389	0 <sup>o</sup> .6912	2404068	289	4	0110
6	0 <sup>o</sup> .7279	1 <sup>o</sup> .2922	9 <sup>o</sup> .4336	0 <sup>o</sup> .6896	2404069	290	5	0137
7	—0 <sup>o</sup> .7530	+1 <sup>o</sup> .2898	—9 <sup>o</sup> .4283	+0 <sup>o</sup> .6880	2404070	291	6	0164
8	0 <sup>o</sup> .7767	1 <sup>o</sup> .2873	9 <sup>o</sup> .4228	0 <sup>o</sup> .6862	2404071	292	7	0192
9	0 <sup>o</sup> .7990	1 <sup>o</sup> .2846	9 <sup>o</sup> .4174	0 <sup>o</sup> .6845	2404072	293	8	0219
10	—0 <sup>o</sup> .8201	+1 <sup>o</sup> .2818	—9 <sup>o</sup> .4119	+0 <sup>o</sup> .6827	2404073	294	9	0246
11	0 <sup>o</sup> .8401	1 <sup>o</sup> .2788	9 <sup>o</sup> .4064	0 <sup>o</sup> .6808	2404074	295	10	0274
12	0 <sup>o</sup> .8590	1 <sup>o</sup> .2757	9 <sup>o</sup> .4009	0 <sup>o</sup> .6788	2404075	296	11	0301
13	—0 <sup>o</sup> .8771	+1 <sup>o</sup> .2724	—9 <sup>o</sup> .3953	+0 <sup>o</sup> .6769	2404076	297	12	0329
14	0 <sup>o</sup> .8942	1 <sup>o</sup> .2689	9 <sup>o</sup> .3897	0 <sup>o</sup> .6748	2404077	298	13	0356
15	0 <sup>o</sup> .9106	1 <sup>o</sup> .2653	9 <sup>o</sup> .3841	0 <sup>o</sup> .6727	2404078	299	14	0383
16	—0 <sup>o</sup> .9263	+1 <sup>o</sup> .2615	—9 <sup>o</sup> .3784	+0 <sup>o</sup> .6706	2404079	300	15	0411
17	0 <sup>o</sup> .9413	1 <sup>o</sup> .2575	9 <sup>o</sup> .3727	0 <sup>o</sup> .6684	2404080	301	16	0438
18	0 <sup>o</sup> .9556	1 <sup>o</sup> .2534	9 <sup>o</sup> .3670	0 <sup>o</sup> .6662	2404081	302	17	0465
19	—0 <sup>o</sup> .9694	+1 <sup>o</sup> .2490	—9 <sup>o</sup> .3613	+0 <sup>o</sup> .6639	2404082	303	18	0493
20	0 <sup>o</sup> .9826	1 <sup>o</sup> .2445	9 <sup>o</sup> .3555	0 <sup>o</sup> .6616	2404083	304	19	0520
21	0 <sup>o</sup> .9952	1 <sup>o</sup> .2398	9 <sup>o</sup> .3497	0 <sup>o</sup> .6592	2404084	305	20	0548
22	—1 <sup>o</sup> .0074	+1 <sup>o</sup> .2350	—9 <sup>o</sup> .3439	+0 <sup>o</sup> .6568	2404085	306	21	0575
23	1 <sup>o</sup> .0191	1 <sup>o</sup> .2299	9 <sup>o</sup> .3381	0 <sup>o</sup> .6543	2404086	307	22	0602
24	1 <sup>o</sup> .0304	1 <sup>o</sup> .2246	9 <sup>o</sup> .3322	0 <sup>o</sup> .6518	2404087	308	23	0630
25	—1 <sup>o</sup> .0412	+1 <sup>o</sup> .2191	—9 <sup>o</sup> .3264	+0 <sup>o</sup> .6493	2404088	309	24	0657
26	1 <sup>o</sup> .0517	1 <sup>o</sup> .2135	9 <sup>o</sup> .3205	0 <sup>o</sup> .6467	2404089	310	25	0684
27	1 <sup>o</sup> .0617	1 <sup>o</sup> .2076	9 <sup>o</sup> .3146	0 <sup>o</sup> .6441	2404090	311	26	0712
28	—1 <sup>o</sup> .0714	+1 <sup>o</sup> .2015	—9 <sup>o</sup> .3086	+0 <sup>o</sup> .6414	2404091	312	27	0739
29	1 <sup>o</sup> .0808	1 <sup>o</sup> .1951	9 <sup>o</sup> .3027	0 <sup>o</sup> .6388	2404092	313	28	0767
30	1 <sup>o</sup> .0898	1 <sup>o</sup> .1886	9 <sup>o</sup> .2967	0 <sup>o</sup> .6361	2404093	314	29	0794
31	1 <sup>o</sup> .0985	1 <sup>o</sup> .1818	9 <sup>o</sup> .2907	0 <sup>o</sup> .6334	2404094	315	30	0821
32	—1 <sup>o</sup> .1069	+1 <sup>o</sup> .1747	—9 <sup>o</sup> .2848	+0 <sup>o</sup> .6306	2404095	316	31	0849

\* Add 0.0026 if Fraction be required for the time *t*, see page 329.

\* Add 0026 if Fraction be required for the time  $t$ , see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	20 59 51 <sup>66</sup>	10 <sup>187</sup>	S. 17 3 56 <sup>9</sup>	42 <sup>81</sup>	1 8 <sup>23</sup>	13 51 <sup>69</sup>	0 <sup>329</sup>
Wed.	2	21 3 55 <sup>72</sup>	10 <sup>152</sup>	16 46 40 <sup>5</sup>	43 <sup>55</sup>	1 8 <sup>12</sup>	13 59 <sup>17</sup>	0 <sup>294</sup>
Thur.	3	21 7 58 <sup>94</sup>	10 <sup>117</sup>	16 29 6 <sup>7</sup>	44 <sup>27</sup>	1 8 <sup>00</sup>	14 5 <sup>82</sup>	0 <sup>260</sup>
Frid.	4	21 12 1 <sup>34</sup>	10 <sup>082</sup>	16 11 15 <sup>7</sup>	44 <sup>97</sup>	1 7 <sup>89</sup>	14 11 <sup>64</sup>	0 <sup>225</sup>
Sat.	5	21 16 2 <sup>90</sup>	10 <sup>048</sup>	15 53 8 <sup>1</sup>	45 <sup>66</sup>	1 7 <sup>78</sup>	14 16 <sup>64</sup>	0 <sup>191</sup>
Sun.	6	21 20 3 <sup>63</sup>	10 <sup>013</sup>	15 34 44 <sup>1</sup>	46 <sup>33</sup>	1 7 <sup>66</sup>	14 20 <sup>81</sup>	0 <sup>156</sup>
Mon.	7	21 24 3 <sup>54</sup>	9 <sup>979</sup>	15 16 4 <sup>3</sup>	46 <sup>98</sup>	1 7 <sup>55</sup>	14 24 <sup>15</sup>	0 <sup>122</sup>
Tues.	8	21 28 2 <sup>63</sup>	9 <sup>945</sup>	14 57 9 <sup>1</sup>	47 <sup>61</sup>	1 7 <sup>44</sup>	14 26 <sup>68</sup>	0 <sup>089</sup>
Wed.	9	21 32 0 <sup>92</sup>	9 <sup>912</sup>	14 37 58 <sup>8</sup>	48 <sup>23</sup>	1 7 <sup>33</sup>	14 28 <sup>41</sup>	0 <sup>055</sup>
Thur.	10	21 35 58 <sup>39</sup>	9 <sup>878</sup>	14 18 34 <sup>0</sup>	48 <sup>83</sup>	1 7 <sup>22</sup>	14 29 <sup>33</sup>	0 <sup>021</sup>
Frid.	11	21 39 55 <sup>06</sup>	9 <sup>845</sup>	13 58 55 <sup>0</sup>	49 <sup>41</sup>	1 7 <sup>11</sup>	14 29 <sup>44</sup>	0 <sup>012</sup>
Sat.	12	21 43 50 <sup>95</sup>	9 <sup>813</sup>	13 39 2 <sup>3</sup>	49 <sup>98</sup>	1 7 <sup>00</sup>	14 28 <sup>77</sup>	0 <sup>044</sup>
Sun.	13	21 47 46 <sup>07</sup>	9 <sup>781</sup>	13 18 56 <sup>2</sup>	50 <sup>52</sup>	1 6 <sup>89</sup>	14 27 <sup>34</sup>	0 <sup>076</sup>
Mon.	14	21 51 40 <sup>42</sup>	9 <sup>749</sup>	12 58 37 <sup>3</sup>	51 <sup>05</sup>	1 6 <sup>78</sup>	14 25 <sup>14</sup>	0 <sup>107</sup>
Tues.	15	21 55 34 <sup>02</sup>	9 <sup>718</sup>	12 38 5 <sup>8</sup>	51 <sup>56</sup>	1 6 <sup>67</sup>	14 22 <sup>20</sup>	0 <sup>138</sup>
Wed.	16	21 59 26 <sup>89</sup>	9 <sup>688</sup>	12 17 22 <sup>3</sup>	52 <sup>06</sup>	1 6 <sup>57</sup>	14 18 <sup>53</sup>	0 <sup>168</sup>
Thur.	17	22 3 19 <sup>04</sup>	9 <sup>658</sup>	11 56 27 <sup>0</sup>	52 <sup>54</sup>	1 6 <sup>47</sup>	14 14 <sup>15</sup>	0 <sup>197</sup>
Frid.	18	22 7 10 <sup>49</sup>	9 <sup>630</sup>	11 35 20 <sup>5</sup>	53 <sup>00</sup>	1 6 <sup>37</sup>	14 9 <sup>06</sup>	0 <sup>226</sup>
Sat.	19	22 11 1 <sup>28</sup>	9 <sup>602</sup>	11 14 3 <sup>0</sup>	53 <sup>45</sup>	1 6 <sup>27</sup>	14 3 <sup>30</sup>	0 <sup>254</sup>
Sun.	20	22 14 51 <sup>41</sup>	9 <sup>575</sup>	10 52 34 <sup>9</sup>	53 <sup>88</sup>	1 6 <sup>18</sup>	13 56 <sup>89</sup>	0 <sup>280</sup>
Mon.	21	22 18 40 <sup>90</sup>	9 <sup>549</sup>	10 30 56 <sup>7</sup>	54 <sup>30</sup>	1 6 <sup>08</sup>	13 49 <sup>84</sup>	0 <sup>307</sup>
Tues.	22	22 22 29 <sup>76</sup>	9 <sup>523</sup>	10 9 8 <sup>6</sup>	54 <sup>70</sup>	1 5 <sup>99</sup>	13 42 <sup>17</sup>	0 <sup>332</sup>
Wed.	23	22 26 18 <sup>02</sup>	9 <sup>499</sup>	9 47 11 <sup>3</sup>	55 <sup>08</sup>	1 5 <sup>90</sup>	13 33 <sup>90</sup>	0 <sup>357</sup>
Thur.	24	22 30 5 <sup>69</sup>	9 <sup>474</sup>	9 25 5 <sup>0</sup>	55 <sup>44</sup>	1 5 <sup>81</sup>	13 25 <sup>04</sup>	0 <sup>381</sup>
Frid.	25	22 33 52 <sup>78</sup>	9 <sup>450</sup>	9 2 50 <sup>1</sup>	55 <sup>79</sup>	1 5 <sup>72</sup>	13 15 <sup>61</sup>	0 <sup>405</sup>
Sat.	26	22 37 39 <sup>31</sup>	9 <sup>427</sup>	8 40 27 <sup>0</sup>	56 <sup>12</sup>	1 5 <sup>64</sup>	13 5 <sup>62</sup>	0 <sup>428</sup>
Sun.	27	22 41 25 <sup>29</sup>	9 <sup>404</sup>	8 17 56 <sup>3</sup>	56 <sup>43</sup>	1 5 <sup>56</sup>	12 55 <sup>07</sup>	0 <sup>451</sup>
Mon.	28	22 45 10 <sup>72</sup>	9 <sup>382</sup>	7 55 18 <sup>2</sup>	56 <sup>73</sup>	1 5 <sup>48</sup>	12 43 <sup>98</sup>	0 <sup>473</sup>
Tues.	29	22 48 55 <sup>63</sup>	9 <sup>361</sup>	S. 7 32 33 <sup>3</sup>	57 <sup>01</sup>	1 5 <sup>40</sup>	12 32 <sup>38</sup>	0 <sup>494</sup>

\*Mean Time of the Semidiameter passing may be found by subtracting 0<sup>18</sup> from the *Sidereal Time*.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subtracted from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		h m s	° ' "	' "	m s	h m s
Tues.	1	20 59 49.30	S. 17 4 6.7	16 15.7	13 51.61	20 45 57.69
Wed.	2	21 3 53.35	16 46 50.7	16 15.6	13 59.10	20 49 54.25
Thur.	3	21 7 56.56	16 29 17.1	16 15.4	14 5.76	20 53 50.80
Frid.	4	21 11 58.95	16 11 26.4	16 15.3	14 11.59	20 57 47.36
Sat.	5	21 16 0.51	15 53 18.9	16 15.1	14 16.60	21 1 43.91
Sun.	6	21 20 1.24	15 34 55.2	16 14.9	14 20.77	21 5 40.47
Mon.	7	21 24 1.15	15 16 15.6	16 14.8	14 24.12	21 9 37.03
Tues.	8	21 28 0.24	14 57 20.5	16 14.6	14 26.66	21 13 33.58
Wed.	9	21 31 58.53	14 38 10.5	16 14.4	14 28.40	21 17 30.13
Thur.	10	21 35 56.00	14 18 45.8	16 14.3	14 29.32	21 21 26.68
Frid.	11	21 39 52.68	13 59 6.9	16 14.1	14 29.44	21 25 23.24
Sat.	12	21 43 48.58	13 39 14.3	16 13.9	14 28.78	21 29 19.80
Sun.	13	21 47 43.71	13 19 8.4	16 13.7	14 27.36	21 33 16.35
Mon.	14	21 51 38.07	12 58 49.5	16 13.5	14 25.17	21 37 12.90
Tues.	15	21 55 31.69	12 38 18.2	16 13.3	14 22.23	21 41 9.46
Wed.	16	21 59 24.58	12 17 34.7	16 13.1	14 18.57	21 45 6.01
Thur.	17	22 3 16.75	11 56 39.5	16 12.9	14 14.19	21 49 2.56
Frid.	18	22 7 8.22	11 35 33.0	16 12.7	14 9.11	21 52 59.11
Sat.	19	22 10 59.03	11 14 15.5	16 12.4	14 3.36	21 56 55.67
Sun.	20	22 14 49.18	10 52 47.4	16 12.2	13 56.96	22 0 52.22
Mon.	21	22 18 38.69	10 31 9.2	16 12.0	13 49.91	22 4 48.78
Tues.	22	22 22 27.58	10 9 21.1	16 11.8	13 42.25	22 8 45.33
Wed.	23	22 26 15.87	9 47 23.7	16 11.5	13 33.99	22 12 41.88
Thur.	24	22 30 3.57	9 25 17.3	16 11.3	13 25.13	22 16 38.44
Frid.	25	22 33 50.69	9 3 2.4	16 11.1	13 15.70	22 20 34.99
Sat.	26	22 37 37.25	8 40 39.3	16 10.8	13 5.71	22 24 31.54
Sun.	27	22 41 23.26	8 18 8.5	16 10.6	12 55.16	22 28 28.10
Mon.	28	22 45 8.73	7 55 30.3	16 10.3	12 44.08	22 32 24.65
Tues.	29	22 48 53.68	S. 7 32 45.2	16 10.1	12 32.48	22 36 21.20

\* The Semidiameter for *Apparent Noon* may be assumed the same as that for *Mean Noon*.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	312 29 16.7	S. 0.33	9.9937612	15 10.7	15 6.7	55 36.6	55 22.0
2	313 30 8.9	0.44	9.9938284	15 2.9	14 59.4	55 8.1	54 55.1
3	314 30 59.8	0.53	9.9938970	14 56.1	14 53.3	54 43.3	54 32.8
4	315 31 49.4	0.59	9.9939671	14 50.9	14 48.9	54 23.9	54 16.8
5	316 32 37.5	0.64	9.9940385	14 47.5	14 46.8	54 11.7	54 8.8
6	317 33 24.2	0.66	9.9941114	14 46.6	14 47.1	54 8.2	54 10.0
7	318 34 9.4	0.66	9.9941858	14 48.3	14 50.2	54 14.4	54 21.4
8	319 34 53.0	0.64	9.9942619	14 52.8	14 56.2	54 31.1	54 43.3
9	320 35 35.0	0.59	9.9943396	15 0.2	15 4.9	54 58.0	55 15.2
10	321 36 15.5	0.53	9.9944191	15 10.2	15 16.1	55 34.7	55 56.2
11	322 36 54.3	0.43	9.9945004	15 22.4	15 29.1	56 19.4	56 44.1
12	323 37 31.4	0.32	9.9945837	15 36.2	15 43.3	57 9.8	57 36.0
13	324 38 6.9	0.20	9.9946690	15 50.5	15 57.5	58 2.3	58 28.0
14	325 38 40.7	S. 0.06	9.9947565	16 4.2	16 10.4	58 52.5	59 15.3
15	326 39 12.8	N. 0.08	9.9948461	16 16.0	16 20.8	59 35.8	59 53.5
16	327 39 43.3	0.20	9.9949379	16 24.7	16 27.7	60 8.0	60 18.8
17	328 40 12.3	0.31	9.9950319	16 29.7	16 30.6	60 25.9	60 29.2
18	329 40 39.8	0.39	9.9951280	16 30.4	16 29.3	60 28.7	60 24.6
19	330 41 5.8	0.43	9.9952261	16 27.3	16 24.5	60 17.2	60 6.9
20	331 41 30.5	0.45	9.9953261	16 21.0	16 16.9	59 54.1	59 39.2
21	332 41 53.9	0.42	9.9954278	16 12.4	16 7.6	59 22.7	59 5.1
22	333 42 16.0	0.37	9.9955310	16 2.6	15 57.5	58 46.8	58 28.0
23	334 42 36.7	0.29	9.9956355	15 52.3	15 47.2	58 9.1	57 50.4
24	335 42 56.1	0.18	9.9957412	15 42.2	15 37.3	57 32.1	57 14.1
25	336 43 14.1	N. 0.06	9.9958479	15 32.6	15 28.0	56 56.7	56 40.0
26	337 43 30.5	S. 0.06	9.9959555	15 23.6	15 19.4	56 23.9	56 8.4
27	338 43 45.3	0.19	9.9960638	15 15.4	15 11.5	55 53.7	55 39.6
28	339 43 58.5	0.31	9.9961728	15 7.9	15 4.4	55 26.2	55 13.5
29	340 44 10.0	S. 0.42	9.9962823	15 1.1	14 58.1	55 1.5	54 50.3



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	Longitude.		Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>d</sup>	<sup>h</sup> <sup>m</sup>
Tues.	1	322 19 30.6	328 34 5.5	S. 2 8 3.1	S. 2 38 44.1	0.8	0 57.5
Wed.	2	334 45 33.6	340 54 4.1	3 7 16.1	3 33 22.8	1.8	1 44.4
Thur.	3	346 59 48.6	353 3 1.7	3 56 50.4	4 17 27.7	2.8	2 28.9
Frid.	4	359 4 0.9	5 3 6.4	4 35 5.3	4 49 36.3	3.8	3 11.5
Sat.	5	11 0 41.3	16 57 11.3	5 0 54.8	5 8 56.8	4.8	3 53.1
Sun.	6	22 53 4.5	28 48 51.1	5 13 39.8	5 15 1.6	5.8	4 34.4
Mon.	7	34 45 3.6	40 42 15.7	5 13 1.5	5 7 39.6	6.8	5 16.4
Tues.	8	46 41 2.4	52 41 59.7	4 58 56.4	4 46 53.7	7.8	5 59.8
Wed.	9	58 45 43.2	64 52 48.9	4 31 34.1	4 13 1.5	8.8	6 45.4
Thur.	10	71 3 51.6	77 19 24.3	3 51 21.1	3 26 40.5	9.8	7 33.9
Frid.	11	83 39 57.5	90 5 58.3	2 59 9.1	2 28 59.3	10.8	8 25.4
Sat.	12	96 37 49.1	103 15 47.2	1 56 26.9	1 21 51.6	11.8	9 19.8
Sun.	13	110 0 2.7	116 50 38.4	S. 0 45 36.4	S. 0 8 9.7	12.8	10 16.2
Mon.	14	123 47 28.6	130 50 18.2	N. 0 29 56.5	N. 1 8 6.0	13.8	11 13.5
Tues.	15	137 58 42.6	145 12 8.1	1 45 39.7	2 21 56.2	14.8	12 10.5
Wed.	16	152 29 51.5	159 51 2.4	2 56 13.2	3 27 49.5	15.8	13 6.3
Thur.	17	167 14 44.3	174 39 56.7	3 56 6.3	4 20 28.7	16.8	14 0.7
Frid.	18	182 5 37.1	189 30 44.5	4 40 28.1	4 55 42.9	17.8	14 53.9
Sat.	19	196 54 20.6	204 15 33.3	5 5 58.2	5 11 7.1	18.8	15 46.6
Sun.	20	211 33 36.8	218 47 54.4	5 11 10.2	5 6 15.0	19.8	16 39.3
Mon.	21	225 57 57.4	233 3 26.1	4 56 34.5	4 42 26.4	20.8	17 32.7
Tues.	22	240 4 9.0	247 0 1.9	4 24 12.9	4 2 18.6	21.8	18 26.9
Wed.	23	253 51 6.8	260 37 30.7	3 37 9.8	3 9 14.7	22.8	19 21.7
Thur.	24	267 19 24.6	273 57 1.8	2 39 1.5	2 6 58.8	23.8	20 16.5
Frid.	25	280 30 37.6	287 0 27.8	1 33 35.2	N. 0 59 18.6	24.8	21 10.4
Sat.	26	293 26 48.1	299 49 53.3	N. 0 24 36.2	S. 0 10 5.5	25.8	22 2.5
Sun.	27	306 9 57.5	312 27 13.3	S. 0 44 21.2	1 17 46.7	26.8	22 52.3
Mon.	28	318 41 52.1	324 54 4.1	1 49 59.5	2 20 38.6	27.8	23 39.6
Tues.	29	331 3 57.8	337 11 41.8	S. 2 49 24.5	S. 3 15 59.9	28.8	6



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 1.</b>				<b>THURSDAY 3.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
1	21 41 37.96	16 5 48.4	77.78	1	23 18 22.36	8 46 18.0	101.98
2	21 43 44.64	15 57 59.5	78.51	2	23 20 17.98	8 36 5.2	102.27
3	21 45 51.06	15 50 6.3	79.22	3	23 22 13.42	8 25 50.7	102.56
4	21 47 57.21	15 42 8.9	79.91	4	23 24 8.68	8 15 34.5	102.84
5	21 50 3.10	15 34 7.4	80.59	5	23 26 3.77	8 5 16.6	103.12
6	21 52 8.74	15 26 1.8	81.27	6	23 27 58.70	7 54 57.1	103.38
7	21 54 14.11	15 17 52.1	81.95	7	23 29 53.45	7 44 36.0	103.65
8	21 56 19.22	15 9 38.4	82.61	8	23 31 48.03	7 34 13.3	103.90
9	21 58 24.07	15 1 20.8	83.25	9	23 33 42.46	7 23 49.2	104.14
10	22 0 28.66	14 52 59.4	83.89	10	23 35 36.72	7 13 23.6	104.38
11	22 2 33.00	14 44 34.1	84.52	11	23 37 30.83	7 2 56.6	104.61
12	22 4 37.07	14 36 5.1	85.14	12	23 39 24.79	6 52 28.3	104.83
13	22 6 40.89	14 27 32.4	85.76	13	23 41 18.59	6 41 58.7	105.04
14	22 8 44.46	14 18 56.0	86.36	14	23 43 12.24	6 31 27.8	105.26
15	22 10 47.78	14 10 16.1	86.95	15	23 45 5.75	6 20 55.6	105.46
16	22 12 50.85	14 1 32.6	87.54	16	23 46 59.12	6 10 22.3	105.65
17	22 14 53.66	13 52 45.6	88.12	17	23 48 52.34	5 59 47.8	105.84
18	22 16 56.23	13 43 55.2	88.68	18	23 50 45.43	5 49 12.2	106.02
19	22 18 58.55	13 35 1.4	89.24	19	23 52 38.39	5 38 35.5	106.20
20	22 21 0.63	13 26 4.3	89.79	20	23 54 31.22	5 27 57.8	106.36
21	22 23 2.46	13 17 3.9	90.33	21	23 56 23.92	5 17 19.2	106.52
22	22 25 4.05	13 8 0.3	90.87	22	23 58 16.49	5 6 39.6	106.67
23	22 27 5.40	12 58 53.5	91.39	23	0 0 8.94	4 55 59.1	106.82
24	22 29 6.51	S. 12 49 43.6	91.90	24	0 2 1.27	S. 4 45 17.7	106.96
<b>WEDNESDAY 2.</b>				<b>FRIDAY 4.</b>			
0	22 31 7.38	S. 12 40 30.7	92.40	0	0 3 53.49	S. 4 34 35.6	107.09
1	22 33 8.02	12 31 14.8	92.90	1	0 5 45.60	4 23 52.7	107.22
2	22 35 8.42	12 21 55.9	93.39	2	0 7 37.59	4 13 9.0	107.33
3	22 37 8.60	12 12 34.1	93.87	3	0 9 29.48	4 2 24.7	107.44
4	22 39 8.54	12 3 9.5	94.33	4	0 11 21.27	3 51 39.7	107.56
5	22 41 8.25	11 53 42.1	94.79	5	0 13 12.96	3 40 54.0	107.66
6	22 43 7.74	11 44 12.0	95.25	6	0 15 4.55	3 30 7.8	107.74
7	22 45 7.01	11 34 39.1	95.70	7	0 16 56.04	3 19 21.1	107.83
8	22 47 6.05	11 25 3.6	96.13	8	0 18 47.45	3 8 33.8	107.92
9	22 49 4.87	11 15 25.6	96.55	9	0 20 38.77	2 57 46.1	107.99
10	22 51 3.48	11 5 45.0	96.97	10	0 22 30.00	2 46 57.9	108.06
11	22 53 1.87	10 56 1.9	97.38	11	0 24 21.15	2 36 9.4	108.11
12	22 55 0.04	10 46 16.4	97.78	12	0 26 12.23	2 25 20.6	108.17
13	22 56 58.00	10 36 28.5	98.17	13	0 28 3.23	2 14 31.4	108.22
14	22 58 55.76	10 26 38.3	98.56	14	0 29 54.16	2 3 41.9	108.27
15	23 0 53.31	10 16 45.8	98.94	15	0 31 45.02	1 52 52.2	108.30
16	23 2 50.65	10 6 51.0	99.32	16	0 33 35.82	1 42 2.3	108.33
17	23 4 47.79	9 56 54.0	99.68	17	0 35 26.55	1 31 12.2	108.36
18	23 6 44.73	9 46 54.9	100.03	18	0 37 17.22	1 20 22.0	108.37
19	23 8 41.48	9 36 53.7	100.37	19	0 39 7.84	1 9 31.7	108.38
20	23 10 38.03	9 26 50.5	100.70	20	0 40 58.41	0 58 41.4	108.39
21	23 12 34.40	9 16 45.3	101.03	21	0 42 48.93	0 47 51.0	108.39
22	23 14 30.57	9 6 38.1	101.36	22	0 44 39.40	0 37 0.7	108.38
23	23 16 26.55	8 56 29.0	101.68	23	0 46 29.83	0 26 10.4	108.37
24	23 18 22.36	S. 8 46 18.0	101.98	24	0 48 20.22	S. 0 15 20.2	108.35



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 5.</b>				<b>MONDAY 7.</b>			
0	<sup>h</sup> 0 <sup>m</sup> 48 <sup>s</sup> 20.22	<sup>°</sup> S. 0 <sup>'</sup> 15 <sup>"</sup> 20.2	108.35	0	<sup>h</sup> 2 <sup>m</sup> 16 <sup>s</sup> 57.98	<sup>°</sup> N. 8 <sup>'</sup> 11 <sup>"</sup> 38.2	100.68
1	0 50 10.58	S. 0 4 30.2	108.33	1	2 18 50.52	8 21 41.4	100.38
2	0 52 0.90	N. 0 6 19.7	108.30	2	2 20 43.18	8 31 42.7	100.07
3	0 53 51.19	0 17 9.4	108.26	3	2 22 35.97	8 41 42.2	99.76
4	0 55 41.46	0 27 58.8	108.21	4	2 24 28.89	8 51 39.8	99.43
5	0 57 31.71	0 38 47.9	108.17	5	2 26 21.94	9 1 35.4	99.10
6	0 59 21.94	0 49 36.8	108.12	6	2 28 15.14	9 11 29.0	98.77
7	1 1 12.15	1 0 25.3	108.05	7	2 30 8.48	9 21 20.6	98.43
8	1 3 2.35	1 11 13.4	107.99	8	2 32 1.96	9 31 10.2	98.09
9	1 4 52.54	1 22 1.2	107.92	9	2 33 55.59	9 40 57.7	97.74
10	1 6 42.72	1 32 48.5	107.84	10	2 35 49.37	9 50 43.1	97.38
11	1 8 32.90	1 43 35.3	107.76	11	2 37 43.30	10 0 26.3	97.02
12	1 10 23.08	1 54 21.6	107.67	12	2 39 37.39	10 10 7.3	96.65
13	1 12 13.27	2 5 7.3	107.58	13	2 41 31.64	10 19 46.1	96.27
14	1 14 3.46	2 15 52.5	107.48	14	2 43 26.06	10 29 22.6	95.89
15	1 15 53.66	2 26 37.1	107.37	15	2 45 20.64	10 38 56.8	95.50
16	1 17 43.88	2 37 21.0	107.26	16	2 47 15.39	10 48 28.6	95.11
17	1 19 34.11	2 48 4.2	107.14	17	2 49 10.31	10 57 58.1	94.71
18	1 21 24.37	2 58 46.7	107.02	18	2 51 5.41	11 7 25.1	94.30
19	1 23 14.65	3 9 28.4	106.89	19	2 53 0.69	11 16 49.7	93.88
20	1 25 4.95	3 20 9.4	106.76	20	2 54 56.15	11 26 11.7	93.46
21	1 26 55.28	3 30 49.5	106.62	21	2 56 51.80	11 35 31.2	93.03
22	1 28 45.65	3 41 28.8	106.48	22	2 58 47.64	11 44 48.1	92.60
23	1 30 36.06	N. 3 52 7.3	106.33	23	3 0 43.66	N. 11 54 2.4	92.15
<b>SUNDAY 6.</b>				<b>TUESDAY 8.</b>			
0	1 32 26.51	N. 4 2 44.8	106.17	0	3 2 39.88	N. 12 3 13.9	91.70
1	1 34 17.00	4 13 21.3	106.01	1	3 4 36.30	12 12 22.8	91.25
2	1 36 7.54	4 23 56.9	105.84	2	3 6 32.91	12 21 28.9	90.78
3	1 37 58.13	4 34 31.4	105.66	3	3 8 29.72	12 30 32.2	90.32
4	1 39 48.77	4 45 4.8	105.48	4	3 10 26.74	12 39 32.7	89.84
5	1 41 39.47	4 55 37.2	105.30	5	3 12 23.97	12 48 30.3	89.36
6	1 43 30.23	5 6 8.4	105.11	6	3 14 21.41	12 57 25.0	88.87
7	1 45 21.05	5 16 38.5	104.92	7	3 16 19.06	13 6 16.7	88.37
8	1 47 11.94	5 27 7.4	104.71	8	3 18 16.93	13 15 5.4	87.87
9	1 49 2.90	5 37 35.0	104.50	9	3 20 15.01	13 23 51.1	87.36
10	1 50 53.93	5 48 1.4	104.29	10	3 22 13.32	13 32 33.7	86.83
11	1 52 45.04	5 58 26.5	104.07	11	3 24 11.85	13 41 13.1	86.31
12	1 54 36.23	6 8 50.2	103.84	12	3 26 10.60	13 49 49.4	85.78
13	1 56 27.51	6 19 12.6	103.62	13	3 28 9.58	13 58 22.5	85.23
14	1 58 18.87	6 29 33.6	103.38	14	3 30 8.79	14 6 52.2	84.68
15	2 0 10.32	6 39 53.1	103.13	15	3 32 8.24	14 15 18.7	84.13
16	2 2 1.86	6 50 11.2	102.88	16	3 34 7.92	14 23 41.8	83.57
17	2 3 53.51	7 0 27.7	102.62	17	3 36 7.84	14 32 1.6	83.01
18	2 5 45.25	7 10 42.7	102.37	18	3 38 8.00	14 40 17.9	82.42
19	2 7 37.09	7 20 56.1	102.10	19	3 40 8.41	14 48 30.6	81.83
20	2 9 29.04	7 31 7.9	101.83	20	3 42 9.06	14 56 39.9	81.25
21	2 11 21.11	7 41 18.1	101.55	21	3 44 9.95	15 4 45.6	80.64
22	2 13 13.28	7 51 26.5	101.26	22	3 46 11.10	15 12 47.6	80.03
23	2 15 5.57	8 1 33.2	100.98	23	3 48 12.50	15 20 46.0	79.42
24	2 16 57.98	N. 8 11 38.2	100.68	24	3 50 14.15	N. 15 28 40.6	78.79



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 9.</b>				<b>FRIDAY 11.</b>			
0	h m s 3 50 14.15	N. 15 28 40.6	78.79	0	h m s 5 33 0.70	N. 20 19 14.9	38.97
1	3 52 16.06	15 36 31.5	78.16	1	5 35 16.24	20 23 5.6	37.93
2	3 54 18.22	15 44 18.5	77.52	2	5 37 32.07	20 26 50.1	36.89
3	3 56 20.65	15 52 1.7	76.87	3	5 39 48.18	20 30 28.3	35.83
4	3 58 23.34	15 59 41.0	76.22	4	5 42 4.57	20 34 0.0	34.75
5	4 0 26.29	16 7 16.4	75.56	5	5 44 21.23	20 37 25.3	33.68
6	4 2 29.51	16 14 47.7	74.88	6	5 46 38.18	20 40 44.2	32.60
7	4 4 33.00	16 22 15.0	74.20	7	5 48 55.40	20 43 56.5	31.51
8	4 6 36.76	16 29 38.1	73.51	8	5 51 12.89	20 47 2.3	30.41
9	4 8 40.79	16 36 57.1	72.82	9	5 53 30.66	20 50 1.4	29.30
10	4 10 45.09	16 44 11.9	72.12	10	5 55 48.69	20 52 53.9	28.18
11	4 12 49.66	16 51 22.5	71.40	11	5 58 6.99	20 55 39.6	27.05
12	4 14 54.51	16 58 28.7	70.68	12	6 0 25.56	20 58 18.5	25.92
13	4 16 59.64	17 5 30.6	69.95	13	6 2 44.39	21 0 50.6	24.78
14	4 19 5.04	17 12 28.1	69.22	14	6 5 3.48	21 3 15.9	23.64
15	4 21 10.73	17 19 21.2	68.48	15	6 7 22.83	21 5 34.3	22.49
16	4 23 16.70	17 26 9.8	67.72	16	6 9 42.44	21 7 45.8	21.33
17	4 25 22.95	17 32 53.8	66.95	17	6 12 2.29	21 9 50.2	20.15
18	4 27 29.49	17 39 33.2	66.17	18	6 14 22.40	21 11 47.6	18.97
19	4 29 36.31	17 46 7.9	65.39	19	6 16 42.75	21 13 37.9	17.78
20	4 31 43.41	17 52 37.9	64.61	20	6 19 3.35	21 15 21.0	16.59
21	4 33 50.81	17 59 3.2	63.82	21	6 21 24.19	21 16 57.0	15.40
22	4 35 58.49	18 5 23.7	63.01	22	6 23 45.27	21 18 25.8	14.19
23	4 38 6.46	N. 18 11 39.3	62.18	23	6 26 6.59	N. 21 19 47.3	12.97
<b>THURSDAY 10.</b>				<b>SATURDAY 12.</b>			
0	4 40 14.73	N. 18 17 49.9	61.36	0	6 28 28.13	N. 21 21 1.5	11.76
1	4 42 23.28	18 23 55.6	60.53	1	6 30 49.91	21 22 8.4	10.53
2	4 44 32.13	18 29 56.3	59.69	2	6 33 11.91	21 23 7.8	9.29
3	4 46 41.26	18 35 51.9	58.84	3	6 35 34.13	21 23 59.9	8.06
4	4 48 50.69	18 41 42.4	57.98	4	6 37 56.57	21 24 44.5	6.81
5	4 51 0.41	18 47 27.7	57.11	5	6 40 19.23	21 25 21.6	5.56
6	4 53 10.42	18 53 7.8	56.23	6	6 42 42.10	21 25 51.2	4.31
7	4 55 20.73	18 58 42.5	55.35	7	6 45 5.17	21 26 13.3	3.05
8	4 57 31.33	19 4 12.0	54.47	8	6 47 28.45	21 26 27.8	1.78
9	4 59 42.23	19 9 36.1	53.56	9	6 49 51.93	21 26 34.6	0.50
10	5 1 53.42	19 14 54.7	52.64	10	6 52 15.61	21 26 33.8	0.78
11	5 4 4.90	19 20 7.8	51.72	11	6 54 39.47	21 26 25.3	2.06
12	5 6 16.67	19 25 15.4	50.80	12	6 57 3.53	21 26 9.1	3.34
13	5 8 28.74	19 30 17.4	49.87	13	6 59 27.77	21 25 45.2	4.64
14	5 10 41.10	19 35 13.8	48.92	14	7 1 52.19	21 25 13.4	5.94
15	5 12 53.75	19 40 4.4	47.96	15	7 4 16.78	21 24 33.9	7.23
16	5 15 6.70	19 44 49.3	47.00	16	7 6 41.55	21 23 46.6	8.54
17	5 17 19.94	19 49 28.4	46.03	17	7 9 6.48	21 22 51.4	9.86
18	5 19 33.46	19 54 1.6	45.04	18	7 11 31.57	21 21 48.3	11.17
19	5 21 47.28	19 58 28.9	44.06	19	7 13 56.82	21 20 37.3	12.49
20	5 24 1.39	20 2 50.3	43.06	20	7 16 22.22	21 19 18.4	13.81
21	5 26 15.79	20 7 5.6	42.05	21	7 18 47.78	21 17 51.6	15.13
22	5 28 30.47	20 11 14.9	41.03	22	7 21 13.47	21 16 16.8	16.47
23	5 30 45.44	20 15 18.0	40.00	23	7 23 39.30	21 14 34.0	17.79
24	5 33 0.70	N. 20 19 14.9	38.97	24	7 26 5.27	N. 21 12 43.3	19.12



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 13.</b>				<b>TUESDAY 15.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	7 26 52.27	N. 21 12 43.3	19.12	0	9 23 56.90	N. 17 7 41.4	81.74
1	7 28 31.37	21 10 44.5	20.47	1	9 26 23.75	16 59 27.4	82.91
2	7 30 57.59	21 8 37.7	21.81	2	9 28 50.52	16 51 6.5	84.08
3	7 33 23.94	21 6 22.8	23.15	3	9 31 17.21	16 42 38.5	85.24
4	7 35 50.40	21 3 59.9	24.48	4	9 33 43.80	16 34 3.6	86.39
5	7 38 16.97	21 1 29.0	25.83	5	9 36 10.30	16 25 21.8	87.53
6	7 40 43.65	20 58 49.9	27.18	6	9 38 36.71	16 16 33.2	88.66
7	7 43 10.42	20 56 2.8	28.52	7	9 41 3.01	16 7 37.9	89.78
8	7 45 37.30	20 53 7.6	29.87	8	9 43 29.22	15 58 35.9	90.88
9	7 48 4.27	20 50 4.4	31.22	9	9 45 55.32	15 49 27.3	91.98
10	7 50 31.32	20 46 53.0	33.57	10	9 48 21.32	15 40 12.1	93.07
11	7 52 58.45	20 43 33.5	33.92	11	9 50 47.21	15 30 50.5	94.14
12	7 55 25.66	20 40 6.0	35.26	12	9 53 12.99	15 21 22.4	95.21
13	7 57 52.94	20 36 30.4	36.61	13	9 55 38.66	15 11 48.0	96.27
14	8 0 20.29	20 32 46.7	37.96	14	9 58 4.21	15 2 7.2	97.31
15	8 2 47.70	20 28 54.9	39.31	15	10 0 29.64	14 52 20.3	98.33
16	8 5 15.17	20 24 55.0	40.66	16	10 2 54.96	14 42 27.2	99.36
17	8 7 42.70	20 20 47.0	42.00	17	10 5 20.16	14 32 28.0	100.37
18	8 10 10.27	20 16 31.0	43.33	18	10 7 45.24	14 22 22.8	101.36
19	8 12 37.88	20 12 7.0	44.67	19	10 10 10.19	14 12 11.7	102.34
20	8 15 5.53	20 7 34.9	46.02	20	10 12 35.02	14 1 54.7	103.32
21	8 17 33.21	20 2 54.8	47.36	21	10 14 59.73	13 51 31.9	104.28
22	8 20 0.92	19 58 6.6	48.69	22	10 17 24.30	13 41 3.4	105.22
23	8 22 28.66	N. 19 53 10.5	50.02	23	10 19 48.75	N. 13 30 29.3	106.15
<b>MONDAY 14.</b>				<b>WEDNESDAY 16.</b>			
0	8 24 56.42	N. 19 48 6.4	51.35	0	10 22 13.07	N. 13 19 49.6	107.07
1	8 27 24.19	19 42 54.3	52.68	1	10 24 37.26	13 9 4.5	107.98
2	8 29 51.97	19 37 34.2	54.01	2	10 27 1.31	12 58 13.9	108.87
3	8 32 19.76	19 32 6.2	55.33	3	10 29 25.24	12 47 18.1	109.74
4	8 34 47.54	19 26 30.3	56.64	4	10 31 49.03	12 36 17.0	110.61
5	8 37 15.32	19 20 46.5	57.95	5	10 34 12.69	12 25 10.8	111.46
6	8 39 43.10	19 14 54.9	59.25	6	10 36 36.21	12 13 59.5	112.30
7	8 42 10.86	19 8 55.5	60.55	7	10 38 59.60	12 2 43.2	113.13
8	8 44 38.60	19 2 48.3	61.85	8	10 41 22.86	11 51 22.0	113.93
9	8 47 6.32	18 56 33.3	63.15	9	10 43 45.98	11 39 56.0	114.73
10	8 49 34.02	18 50 10.5	64.43	10	10 46 8.97	11 28 25.2	115.52
11	8 52 1.69	18 43 40.1	65.71	11	10 48 31.82	11 16 49.8	116.28
12	8 54 29.33	18 37 2.0	66.98	12	10 50 54.53	11 5 9.8	117.03
13	8 56 56.93	18 30 16.3	68.26	13	10 53 17.11	10 53 25.4	117.77
14	8 59 24.48	18 23 22.9	69.53	14	10 55 39.55	10 41 36.6	118.49
15	9 1 51.99	18 16 22.0	70.78	15	10 58 1.86	10 29 43.5	119.21
16	9 4 19.45	18 9 13.6	72.02	16	11 0 24.03	10 17 46.1	119.90
17	9 6 46.86	18 1 57.8	73.26	17	11 2 46.07	10 5 44.7	120.58
18	9 9 14.20	17 54 34.5	74.50	18	11 5 7.98	9 53 39.2	121.24
19	9 11 41.49	17 47 3.8	75.73	19	11 7 29.75	9 41 29.8	121.88
20	9 14 8.72	17 39 25.8	76.94	20	11 9 51.39	9 29 16.6	122.52
21	9 16 35.87	17 31 40.5	78.15	21	11 12 12.90	9 16 59.5	123.15
22	9 19 2.96	17 23 48.0	79.35	22	11 14 34.27	9 4 38.8	123.75
23	9 21 29.97	17 15 48.3	80.55	23	11 16 55.52	8 52 14.5	124.33
24	9 23 56.90	N. 17 7 41.4	81.74	24	11 19 16.63	N. 8 39 46.8	124.90



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
THURSDAY 17.				SATURDAY 19.			
0	h m s 11 19 16.63	N. 8 39 46.8	124.90	0	h m s 13 10 8.06	S. 1 56 2.0	134.02
1	11 21 37.62	8 27 15.7	125.47	1	13 12 24.95	2 9 25.6	133.84
2	11 23 58.47	8 14 41.2	126.02	2	13 14 41.81	2 22 48.1	133.64
3	11 26 19.20	8 2 3.5	126.53	3	13 16 58.64	2 36 9.3	133.42
4	11 28 39.81	7 49 22.8	127.04	4	13 19 15.45	2 49 29.2	133.19
5	11 31 0.29	7 36 39.0	127.55	5	13 21 32.24	3 2 47.6	132.95
6	11 33 20.64	7 23 52.2	128.03	6	13 23 49.01	3 16 4.6	132.70
7	11 35 40.87	7 11 2.7	128.49	7	13 26 5.77	3 29 20.0	132.43
8	11 38 0.99	6 58 10.4	128.94	8	13 28 22.52	3 42 33.7	132.13
9	11 40 20.98	6 45 15.4	129.37	9	13 30 39.25	3 55 45.6	131.83
10	11 42 40.85	6 32 17.9	129.78	10	13 32 55.98	4 8 55.7	131.52
11	11 45 0.61	6 19 18.0	130.18	11	13 35 12.70	4 22 3.9	131.20
12	11 47 20.25	6 6 15.7	130.57	12	13 37 29.42	4 35 10.1	130.86
13	11 49 39.78	5 53 11.2	130.94	13	13 39 46.14	4 48 14.2	130.50
14	11 51 59.20	5 40 4.4	131.30	14	13 42 2.86	5 1 16.1	130.13
15	11 54 18.51	5 26 55.6	131.63	15	13 44 19.58	5 14 15.7	129.73
16	11 56 37.71	5 13 44.9	131.95	16	13 46 36.31	5 27 12.9	129.34
17	11 58 56.80	5 0 32.2	132.26	17	13 48 53.06	5 40 7.8	128.93
18	12 1 15.80	4 47 17.8	132.55	18	13 51 9.81	5 53 0.1	128.51
19	12 3 34.69	4 34 1.6	132.83	19	13 53 26.58	6 5 49.9	128.08
20	12 5 53.48	4 20 43.9	133.08	20	13 55 43.36	6 18 37.0	127.63
21	12 8 12.17	4 7 24.6	133.33	21	13 58 0.17	6 31 21.4	127.16
22	12 10 30.76	3 54 3.9	133.56	22	14 0 16.99	6 44 2.9	126.68
23	12 12 49.26	N. 3 40 41.9	133.77	23	14 2 33.84	S. 6 56 41.6	126.19
FRIDAY 18.				SUNDAY 20.			
0	12 15 7.67	N. 3 27 18.7	133.96	0	14 4 50.72	S. 7 9 17.2	125.68
1	12 17 25.99	3 13 54.4	134.14	1	14 7 7.62	7 21 49.8	125.17
2	12 19 44.23	3 0 29.0	134.31	2	14 9 24.56	7 34 19.2	124.64
3	12 22 2.38	2 47 2.7	134.45	3	14 11 41.52	7 46 45.5	124.11
4	12 24 20.44	2 33 35.6	134.58	4	14 13 58.52	7 59 8.5	123.55
5	12 26 38.43	2 20 7.7	134.71	5	14 16 15.56	8 11 28.1	122.98
6	12 28 56.34	2 6 39.1	134.81	6	14 18 32.64	8 23 44.2	122.40
7	12 31 14.17	1 53 10.0	134.89	7	14 20 49.76	8 35 56.9	121.82
8	12 33 31.93	1 39 40.4	134.97	8	14 23 6.92	8 48 6.0	121.22
9	12 35 49.62	1 26 10.4	135.02	9	14 25 24.12	9 0 11.5	120.60
10	12 38 7.23	1 12 40.2	135.06	10	14 27 41.37	9 12 13.2	119.97
11	12 40 24.78	0 59 9.7	135.08	11	14 29 58.67	9 24 11.1	119.33
12	12 42 42.27	0 45 39.2	135.08	12	14 32 16.02	9 36 5.2	118.68
13	12 44 59.70	0 32 8.7	135.08	13	14 34 33.42	9 47 55.3	118.02
14	12 47 17.06	0 18 38.2	135.07	14	14 36 50.88	9 59 41.4	117.34
15	12 49 34.37	N. 0 5 7.9	135.03	15	14 39 8.39	10 11 23.4	116.66
16	12 51 51.63	S. 0 8 22.1	134.98	16	14 41 25.95	10 23 1.3	115.97
17	12 54 8.84	0 21 51.8	134.91	17	14 43 43.58	10 34 35.0	115.25
18	12 56 25.99	0 35 21.0	134.83	18	14 46 1.27	10 46 4.3	114.53
19	12 58 43.10	0 48 49.7	134.73	19	14 48 19.01	10 57 29.3	113.80
20	13 1 0.17	1 2 17.8	134.62	20	14 50 36.82	11 8 49.9	113.06
21	13 3 17.20	1 15 45.1	134.49	21	14 52 54.70	11 20 6.0	112.30
22	13 5 34.19	1 29 11.7	134.35	22	14 55 12.64	11 31 17.5	111.54
23	13 7 51.14	1 42 37.3	134.19	23	14 57 30.65	11 42 24.5	110.77
24	13 10 8.06	S. 1 56 2.0	134.02	24	14 59 48.73	S. 11 53 26.7	109.98



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
MONDAY 21.				WEDNESDAY 23.			
0	14 <sup>h</sup> 59 <sup>m</sup> 48 <sup>s</sup> 73	S. 11° 53' 26".7	109.98	0	16 <sup>h</sup> 51 <sup>m</sup> 45 <sup>s</sup> 85	S. 18° 53' 2".0	61.78
1	15 2 6.88	12 4 24.2	109.18	1	16 54 7.49	18 59 9.2	60.62
2	15 4 25.10	12 15 16.9	108.37	2	16 56 29.18	19 5 9.4	59.44
3	15 6 43.39	12 26 4.7	107.56	3	16 58 50.92	19 11 2.5	58.26
4	15 9 1.75	12 36 47.6	106.73	4	17 1 12.70	19 16 48.5	57.07
5	15 11 20.18	12 47 25.5	105.90	5	17 3 34.52	19 22 27.3	55.88
6	15 13 38.69	12 57 58.4	105.05	6	17 5 56.38	19 27 59.0	54.68
7	15 15 57.28	13 8 26.1	104.18	7	17 8 18.28	19 33 23.5	53.48
8	15 18 15.94	13 18 48.6	103.32	8	17 10 40.21	19 38 40.8	52.28
9	15 20 34.68	13 29 6.0	102.45	9	17 13 2.17	19 43 50.9	51.07
10	15 22 53.50	13 39 18.0	101.55	10	17 15 24.17	19 48 53.7	49.86
11	15 25 12.39	13 49 24.6	100.66	11	17 17 46.19	19 53 49.2	48.64
12	15 27 31.36	13 59 25.9	99.76	12	17 20 8.23	19 58 37.4	47.43
13	15 29 50.42	14 9 21.7	98.84	13	17 22 30.30	20 3 18.3	46.21
14	15 32 9.55	14 19 12.0	97.91	14	17 24 52.39	20 7 51.9	44.98
15	15 34 28.76	14 28 56.6	96.98	15	17 27 14.49	20 12 18.1	43.76
16	15 36 48.06	14 38 35.7	96.04	16	17 29 36.61	20 16 37.0	42.53
17	15 39 7.43	14 48 9.1	95.08	17	17 31 58.73	20 20 48.5	41.30
18	15 41 26.89	14 57 36.7	94.12	18	17 34 20.86	20 24 52.6	40.07
19	15 43 46.42	15 6 58.5	93.15	19	17 36 43.00	20 28 49.3	38.83
20	15 46 6.04	15 16 14.5	92.17	20	17 39 5.14	20 32 38.5	37.58
21	15 48 25.74	15 25 24.6	91.18	21	17 41 27.28	20 36 20.3	36.35
22	15 50 45.51	15 34 28.7	90.19	22	17 43 49.41	20 39 54.7	35.11
23	15 53 5.37	S. 15° 43' 26".9	89.19	23	17 46 11.54	S. 20° 43' 21".6	33.87
TUESDAY 22.				THURSDAY 24.			
0	15 55 25.30	S. 15° 52' 19".0	88.18	0	17 48 33.65	S. 20° 46' 41".1	32.62
1	15 57 45.32	16 1 5.0	87.16	1	17 50 55.75	20 49 53.1	31.37
2	16 0 5.41	16 9 44.9	86.13	2	17 53 17.83	20 52 57.6	30.12
3	16 2 25.59	16 18 18.6	85.10	3	17 55 39.89	20 55 54.6	28.87
4	16 4 45.84	16 26 46.1	84.05	4	17 58 1.93	20 58 44.1	27.62
5	16 7 6.17	16 35 7.2	83.00	5	18 0 23.94	21 1 26.1	26.38
6	16 9 26.58	16 43 22.1	81.95	6	18 2 45.92	21 4 0.7	25.13
7	16 11 47.06	16 51 30.6	80.88	7	18 5 7.86	21 6 27.7	23.88
8	16 14 7.62	16 59 32.7	79.81	8	18 7 29.76	21 8 47.2	22.63
9	16 16 28.25	17 7 28.3	78.73	9	18 9 51.62	21 10 59.2	21.38
10	16 18 48.96	17 15 17.4	77.64	10	18 12 13.44	21 13 3.7	20.13
11	16 21 9.74	17 23 0.0	76.55	11	18 14 35.21	21 15 0.7	18.88
12	16 23 30.59	17 30 36.0	75.45	12	18 16 56.93	21 16 50.2	17.63
13	16 25 51.51	17 38 5.4	74.35	13	18 19 18.59	21 18 32.2	16.38
14	16 28 12.50	17 45 28.2	73.24	14	18 21 40.19	21 20 6.7	15.13
15	16 30 33.56	17 52 44.3	72.12	15	18 24 1.73	21 21 33.7	13.88
16	16 32 54.68	17 59 53.6	70.99	16	18 26 23.21	21 22 53.3	12.63
17	16 35 15.87	18 6 56.2	69.87	17	18 28 44.61	21 24 5.3	11.38
18	16 37 37.12	18 13 52.0	68.73	18	18 31 5.94	21 25 9.9	10.15
19	16 39 58.44	18 20 41.0	67.59	19	18 33 27.20	21 26 7.1	8.91
20	16 42 19.81	18 27 23.1	66.44	20	18 35 48.38	21 26 56.8	7.66
21	16 44 41.24	18 33 58.3	65.28	21	18 38 9.47	21 27 39.0	6.42
22	16 47 2.72	18 40 26.5	64.12	22	18 40 30.48	21 28 13.8	5.18
23	16 49 24.26	18 46 47.8	62.96	23	18 42 51.40	21 28 41.2	3.95
24	16 51 45.85	S. 18° 53' 2.0	61.78	24	18 45 12.22	S. 21° 29' 1.2	2.72



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>FRIDAY 25.</b>				<b>SUNDAY 27.</b>			
0	h m s 18 45 12.22	S. 21 29 1.2	2.72	0	h m s 20 34 58.29	S. 19 27 34.7	51.23
1	18 47 32.95	21 29 13.8	1.49	1	20 37 10.79	19 22 24.4	52.20
2	18 49 53.57	21 29 19.1	0.27	2	20 39 23.07	19 17 8.3	53.16
3	18 52 14.09	21 29 17.0	0.97	3	20 41 35.11	19 11 46.5	54.12
4	18 54 34.50	21 29 7.5	2.19	4	20 43 46.93	19 6 18.9	55.07
5	18 56 54.80	21 28 50.7	3.41	5	20 45 58.52	19 0 45.7	56.01
6	18 59 14.98	21 28 26.6	4.62	6	20 48 9.88	18 55 6.8	56.94
7	19 1 35.05	21 27 55.3	5.83	7	20 50 21.01	18 49 22.4	57.86
8	19 3 54.99	21 27 16.6	7.05	8	20 52 31.90	18 43 32.5	58.77
9	19 6 14.81	21 26 30.7	8.25	9	20 54 42.56	18 37 37.1	59.68
10	19 8 34.51	21 25 37.6	9.45	10	20 56 52.99	18 31 36.3	60.58
11	19 10 54.07	21 24 37.3	10.66	11	20 59 3.18	18 25 30.1	61.47
12	19 13 13.49	21 23 29.7	11.86	12	21 1 13.14	18 19 18.6	62.36
13	19 15 32.78	21 22 15.0	13.04	13	21 3 22.86	18 13 1.8	63.23
14	19 17 51.92	21 20 53.2	14.23	14	21 5 32.34	18 6 39.8	64.09
15	19 20 10.92	21 19 24.3	15.41	15	21 7 41.59	18 0 12.7	64.95
16	19 22 29.78	21 17 48.3	16.58	16	21 9 50.60	17 53 40.4	65.81
17	19 24 48.48	21 16 5.3	17.76	17	21 11 59.37	17 47 3.0	66.65
18	19 27 7.02	21 14 15.2	18.93	18	21 14 7.90	17 40 20.6	67.48
19	19 29 25.41	21 12 18.2	20.08	19	21 16 16.20	17 33 33.2	68.31
20	19 31 43.64	21 10 14.2	21.25	20	21 18 24.25	17 26 40.9	69.13
21	19 34 1.70	21 8 3.2	22.41	21	21 20 32.06	17 19 43.7	69.93
22	19 36 19.60	21 5 45.3	23.55	22	21 22 39.64	17 12 41.8	70.72
23	19 38 37.32	S. 21 3 20.6	24.68	23	21 24 46.98	S. 17 5 35.0	71.52
<b>SATURDAY 26.</b>				<b>MONDAY 28.</b>			
0	19 40 54.88	S. 21 0 49.1	25.82	0	21 26 54.07	S. 16 58 23.5	72.30
1	19 43 12.26	20 58 10.7	26.96	1	21 29 0.93	16 51 7.4	73.08
2	19 45 29.47	20 55 25.6	28.08	2	21 31 7.55	16 43 46.6	73.85
3	19 47 46.50	20 52 33.7	29.20	3	21 33 13.94	16 36 21.2	74.60
4	19 50 3.34	20 49 35.2	30.32	4	21 35 20.08	16 28 51.4	75.34
5	19 52 20.00	20 46 29.9	31.43	5	21 37 25.99	16 21 17.1	76.09
6	19 54 36.47	20 43 18.0	32.53	6	21 39 31.66	16 13 38.3	76.82
7	19 56 52.75	20 39 59.5	33.62	7	21 41 37.09	16 5 55.2	77.54
8	19 59 8.83	20 36 34.5	34.71	8	21 43 42.28	15 58 7.8	78.25
9	20 1 24.72	20 33 3.0	35.79	9	21 45 47.24	15 50 16.2	78.96
10	20 3 40.42	20 29 25.0	36.87	10	21 47 51.96	15 42 20.3	79.66
11	20 5 55.92	20 25 40.5	37.95	11	21 49 56.45	15 34 20.3	80.35
12	20 8 11.21	20 21 49.6	39.01	12	21 52 0.70	15 26 16.1	81.03
13	20 10 26.30	20 17 52.4	40.07	13	21 54 4.72	15 18 7.9	81.70
14	20 12 41.19	20 13 48.8	41.12	14	21 56 8.51	15 9 55.7	82.36
15	20 14 55.86	20 9 39.0	42.16	15	21 58 12.06	15 1 39.6	83.01
16	20 17 10.33	20 5 22.9	43.20	16	22 0 15.38	14 53 19.6	83.66
17	20 19 24.59	20 1 0.6	44.23	17	22 2 18.48	14 44 55.7	84.30
18	20 21 38.63	19 56 32.2	45.25	18	22 4 21.34	14 36 28.0	84.93
19	20 23 52.45	19 51 57.6	46.27	19	22 6 23.98	14 27 56.6	85.54
20	20 26 6.06	19 47 17.0	47.27	20	22 8 26.39	14 19 21.5	86.15
21	20 28 19.45	19 42 30.4	48.27	21	22 10 28.57	14 10 42.8	86.75
22	20 30 32.62	19 37 37.8	49.27	22	22 12 30.53	14 2 0.5	87.35
23	20 32 45.57	19 32 39.2	50.26	23	22 14 32.26	13 53 14.6	87.93
24	20 34 58.29	S. 19 27 34.7	51.23	24	22 16 33.77	S. 13 44 25.3	88.50



MEAN TIME.

PHASES OF THE MOON.

Feb. 8	☾	<i>First Quarter</i>	- - - - -	h m
15	☉	<i>Full Moon</i>	- - - - -	15 28.0
22	☾	<i>Last Quarter</i>	- - - - -	6 46.0

Feb. 5	☾	<i>Apogee</i>	- - - - -	h
17	☾	<i>Perigee</i>	- - - - -	21
			- - - - -	16



MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.	
2	SUN W.	21 28 28	3270	22 53 15	3279	24 17 51	3288	25 42 16	3298	
	α Arietis E.	62 12 56	3093	60 44 38	3109	59 16 39	3125	57 49 0	3142	
	Jupiter E.	67 33 12	2937	66 1 40	2948	64 30 22	2958	62 59 16	2967	
	Aldebaran E.	92 53 42	2892	91 21 13	2902	89 48 57	2912	88 16 53	2920	
3	SUN W.	32 41 35	3345	34 4 55	3353	35 28 5	3363	36 51 4	3371	
	α Arietis E.	50 35 57	3235	49 10 29	3255	47 45 25	3277	46 20 46	3300	
	Jupiter E.	55 26 49	3015	53 56 55	3025	52 27 13	3033	50 57 41	3043	
	Aldebaran E.	80 39 24	2966	79 8 28	2973	77 37 41	2981	76 7 5	2989	
	Pollux E.	124 37 29	3015	123 7 35	3022	121 37 49	3028	120 8 11	3034	
4	SUN W.	43 43 45	3408	45 5 52	3415	46 27 51	3422	47 49 43	3428	
	Venus W.	19 8 57	3518	20 29 1	3455	21 50 16	3403	23 12 29	3360	
	α Arietis E.	39 24 52	3441	38 3 22	3476	36 42 31	3514	35 22 22	3556	
	Jupiter E.	43 32 45	3083	42 4 15	3092	40 35 56	3100	39 7 46	3108	
	Aldebaran E.	68 36 27	3025	67 6 45	3031	65 37 11	3037	64 7 44	3043	
	Pollux E.	112 41 56	3064	111 13 2	3070	109 44 16	3074	108 15 35	3080	
5	SUN W.	54 37 27	3453	55 58 44	3456	57 19 57	3459	58 41 7	3462	
	α Pegasi W.	30 58 3	4994	31 55 3	4839	32 54 7	4702	33 55 5	4582	
	Venus W.	30 13 22	3234	31 38 51	3218	33 4 39	3205	34 30 43	3193	
	Jupiter E.	31 49 14	3144	30 21 58	3152	28 54 51	3160	27 27 54	3168	
	Aldebaran E.	56 42 6	3066	55 13 15	3069	53 44 28	3073	52 15 45	3075	
	Pollux E.	100 53 37	3100	99 25 28	3103	97 57 22	3106	96 29 20	3109	
6	SUN W.	65 26 14	3470	66 47 12	3471	68 8 9	3470	69 29 7	3469	
	α Pegasi W.	39 22 45	4148	40 32 0	4085	41 42 16	4027	42 53 29	3975	
	Venus W.	41 44 18	3144	43 11 34	3137	44 38 59	3128	46 6 34	3120	
	Aldebaran E.	44 52 50	3083	43 24 19	3083	41 55 49	3083	40 27 18	3082	
	Pollux E.	89 9 45	3115	87 41 54	3115	86 14 3	3115	84 46 11	3115	
	Regulus E.	125 1 23	3084	123 32 54	3085	122 4 26	3084	120 35 57	3083	
7	SUN W.	76 14 24	3456	77 35 37	3452	78 56 55	3447	80 18 18	3443	
	Venus W.	53 26 51	3082	54 55 23	3074	56 24 5	3065	57 52 58	3056	
	α Pegasi W.	49 1 18	3768	50 16 54	3735	51 33 4	3704	52 49 47	3675	
	Aldebaran E.	33 4 23	3072	31 35 39	3069	30 6 51	3065	28 37 59	3061	
	Pollux E.	77 26 32	3105	75 58 28	3101	74 30 20	3097	73 2 7	3094	
	Regulus E.	113 13 1	3071	111 44 16	3068	110 15 27	3063	108 46 32	3058	
8	SUN W.	87 6 49	3409	88 28 55	3401	89 51 11	3392	91 13 37	3383	
	Venus W.	65 20 7	3009	66 50 8	2998	68 20 23	2988	69 50 51	2977	
	α Pegasi W.	59 20 48	3546	60 40 21	3523	62 0 20	3501	63 20 43	3480	
	Pollux E.	65 39 40	3067	64 10 50	3060	62 41 52	3053	61 12 45	3046	
	Regulus E.	101 20 18	3027	99 50 39	3020	98 20 51	3011	96 50 52	3003	
9	SUN W.	98 8 36	3329	99 32 14	3316	100 56 7	3304	102 20 14	3291	
	Venus W.	77 26 46	2917	78 58 44	2905	80 30 57	2891	82 3 28	2877	
	α Pegasi W.	70 8 26	3379	71 31 6	3361	72 54 7	3343	74 17 29	3324	
	α Arietis W.	27 2 31	3779	28 17 55	3691	29 34 52	3611	30 53 15	3540	
	Jupiter W.	16 6 22	3131	17 33 54	3098	19 2 6	3069	20 30 53	3044	
	Pollux E.	53 44 50	3005	52 14 43	2997	50 44 26	2987	49 13 57	2978	
	Regulus E.	89 18 8	2953	87 46 56	2942	86 15 30	2931	84 43 50	2918	
10	SUN W.	109 24 51	3218	110 50 39	3203	112 16 45	3187	113 43 10	3171	



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
2	Sun W.	27 6 30	3308	28 30 32	3317	29 54 24	3326	31 18 5	3336
	$\alpha$ Arietis E.	56 21 41	3159	54 54 42	3177	53 28 5	3195	52- 1 50	3214
	Jupiter E.	61 28 22	2977	59 57 41	2987	58 27 12	2997	56 56 55	3006
	Aldebaran E.	86 45 0	2930	85 13 19	2939	83 41 50	2948	82 10 32	2956
3	Sun W.	38 13 54	3379	39 36 35	3386	40 59 7	3394	42 21 30	3401
	$\alpha$ Arietis E.	44 56 35	3325	43 32 53	3351	42 9 40	3378	40 46 59	3408
	Jupiter E.	49 28 21	3051	47 59 12	3059	46 30 12	3068	45 1 24	3076
	Aldebaran E.	74 36 39	2997	73 6 23	3005	71 36 15	3012	70 6 17	3018
	Pollux E.	118 38 40	3041	117 9 18	3047	115 40 3	3053	114 10 56	3059
4	Sun W.	49 11 28	3434	50 33 6	3439	51 54 39	3444	53 16 6	3449
	Venus W.	24 35 31	3125	25 59 13	3126	27 23 29	3127	28 48 13	3128
	$\alpha$ Arietis E.	34 3 0	3603	32 44 29	3655	31 26 54	3713	30 10 20	3779
	Jupiter E.	37 39 46	3115	36 11 54	3123	34 44 12	3129	33 16 38	3137
	Aldebaran E.	62 38 24	3048	61 9 11	3053	59 40 4	3057	58 11 2	3062
	Pollux E.	106 47 1	3084	105 18 32	3089	103 50 9	3093	102 21 51	3096
5	Sun W.	60 2 13	3465	61 23 16	3467	62 44 17	3469	64 5 16	3470
	$\alpha$ Pegasi W.	34 57 45	4476	36 1 58	4380	37 7 37	4394	38 14 35	4417
	Venus W.	35 57 1	3181	37 23 33	3171	38 50 17	3162	40 17 12	3153
	Jupiter E.	26 1 7	3177	24 34 30	3186	23 8 4	3197	21 41 51	3209
	Aldebaran E.	50 47 5	3078	49 18 28	3080	47 49 54	3081	46 21 21	3082
	Pollux E.	95 1 21	3110	93 33 24	3113	92 5 30	3114	90 37 37	3115
6	Sun W.	70 50 6	3467	72 11 7	3465	73 32 10	3463	74 53 15	3460
	$\alpha$ Pegasi W.	44 5 33	3927	45 18 25	3883	46 32 2	3843	47 46 20	3804
	Venus W.	47 34 19	3113	49 2 13	3105	50 30 16	3098	51 58 28	3089
	Aldebaran E.	38 58 47	3081	37 30 14	3079	36 1 39	3078	34 33 2	3076
	Pollux E.	83 18 19	3114	81 50 26	3111	80 22 30	3110	78 54 33	3107
	Regulus E.	119 7 26	3082	117 38 54	3080	116 10 20	3077	114 41 42	3074
7	Sun W.	81 39 46	3437	83 1 21	3431	84 23 2	3424	85 44 51	3416
	Venus W.	59 22 1	3048	60 51 15	3039	62 20 40	3029	63 50 17	3018
	$\alpha$ Pegasi W.	54 7 1	3646	55 24 46	3620	56 42 59	3594	58 1 40	3569
	Aldebaran E.	27 9 2	3056	25 39 59	3052	24 10 51	3046	22 41 35	3041
	Pollux E.	71 33 50	3089	70 5 27	3084	68 36 58	3078	67 8 22	3073
	Regulus E.	107 17 31	3053	105 48 24	3047	104 19 10	3041	102 49 48	3035
8	Sun W.	92 36 13	3373	93 59 0	3362	95 22 0	3352	96 45 11	3340
	Venus W.	71 21 33	2966	72 52 29	2954	74 23 39	2942	75 55 5	2930
	$\alpha$ Pegasi W.	64 41 30	3459	66 2 40	3439	67 24 13	3419	68 46 8	3399
	Pollux E.	59 43 29	3039	58 14 5	3031	56 44 30	3022	55 14 45	3014
	Regulus E.	95 20 43	2994	93 50 23	2984	92 19 50	2975	90 49 6	2964
9	Sun W.	103 44 36	3277	105 9 15	3263	106 34 10	3248	107 59 22	3234
	Venus W.	83 36 16	2864	85 9 21	2849	86 42 45	2834	88 16 27	2821
	$\alpha$ Pegasi W.	75 41 13	3306	77 5 18	3288	78 29 43	3270	79 54 30	3253
	$\alpha$ Arietis W.	32 12 55	3476	33 33 46	3418	34 55 42	3365	36 18 38	3317
	Jupiter W.	22 0 11	3021	23 29 58	2998	25 0 13	2977	26 30 54	2957
	Pollux E.	47 43 17	2968	46 12 24	2959	44 41 20	2950	43 10 4	2940
	Regulus E.	83 11 54	2905	81 39 42	2892	80 7 13	2879	78 34 28	2865
10	Sun W.	115 9 54	3154	116 36 58	3137	118 4 23	3120	119 32 8	3102



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
10	$\alpha$ Pegasi W.	81 19 36	3235	82 45 4	3219	84 10 51	3201	85 36 59	3184
	$\alpha$ Arietis W.	37 42 30	3272	39 7 14	3230	40 32 48	3191	41 59 8	3154
	Jupiter W.	28 2 0	2938	29 33 31	2920	31 5 25	2901	32 37 43	2882
	Pollux E.	41 38 36	2931	40 6 56	2922	38 35 5	2913	37 3 3	2906
	Regulus E.	77 1 24	2852	75 28 3	2837	73 54 23	2822	72 20 24	2808
11	Sun W.	121 0 15	3085	122 28 43	3067	123 57 33	3049	125 26 45	3031
	$\alpha$ Pegasi W.	92 52 32	3105	94 20 35	3089	95 48 58	3075	97 17 38	3061
	$\alpha$ Arietis W.	49 21 21	2993	50 51 43	2964	52 22 41	2936	53 54 14	2909
	Jupiter W.	40 25 8	2791	41 59 48	2772	43 34 52	2754	45 10 20	2736
	Aldebaran W.	15 50 50	2741	17 26 36	2722	19 2 47	2702	20 39 24	2684
	Pollux E.	29 20 46	2882	27 48 4	2883	26 15 24	2887	24 42 49	2897
	Regulus E.	64 25 28	2728	62 49 25	2711	61 13 0	2695	59 36 13	2678
12	Spica E.	118 10 46	2769	116 35 37	2751	115 0 5	2732	113 24 8	2715
	$\alpha$ Pegasi W.	104 45 9	2998	106 15 24	2987	107 45 53	2977	109 16 35	2969
	$\alpha$ Arietis W.	61 40 18	2784	63 15 7	2761	64 50 26	2738	66 26 15	2716
	Jupiter W.	53 13 47	2644	54 51 42	2626	56 30 2	2607	58 8 47	2589
	Aldebaran W.	28 48 39	2592	30 27 45	2574	32 7 15	2556	33 47 10	2538
13	Regulus E.	51 26 35	2591	49 47 28	2574	48 7 58	2558	46 28 5	2540
	Spica E.	105 18 25	2624	103 40 2	2606	102 1 15	2588	100 22 4	2570
	$\alpha$ Arietis W.	74 32 36	2612	76 11 15	2592	77 50 21	2573	79 29 54	2555
	Jupiter W.	66 28 47	2499	68 10 1	2482	69 51 39	2465	71 33 42	2448
	Aldebaran W.	42 13 0	2435	43 55 24	2433	45 38 12	2415	47 21 25	2398
14	Regulus E.	38 2 37	2455	36 20 20	2439	34 37 41	2422	32 54 38	2407
	Spica E.	91 59 56	2482	90 18 17	2465	88 36 14	2448	86 53 47	2431
	$\alpha$ Arietis W.	87 53 44	2470	89 35 39	2455	91 17 56	2441	93 0 32	2427
	Jupiter W.	80 9 50	2367	81 54 12	2352	83 38 56	2337	85 24 1	2323
	Aldebaran W.	56 3 23	2318	57 48 56	2304	59 34 50	2289	61 21 6	2275
15	Pollux W.	13 47 47	2955	15 18 56	2811	16 53 10	2702	18 29 47	2618
	Spica E.	78 15 48	2353	76 31 6	2339	74 46 3	2324	73 0 39	2311
	$\alpha$ Arietis W.	101 38 8	2369	103 22 27	2361	105 6 58	2353	106 51 41	2345
	Jupiter W.	94 14 26	2258	96 1 27	2247	97 48 44	2237	99 36 17	2226
	Aldebaran W.	70 17 27	2210	72 5 40	2198	73 54 10	2188	75 42 56	2177
16	Pollux W.	26 55 31	2375	28 39 42	2346	30 24 35	2339	32 10 7	2296
	Spica E.	64 9 3	2252	62 21 52	2243	60 34 28	2233	58 46 49	2224
	Antares E.	110 2 20	2263	108 15 26	2251	106 28 14	2239	104 40 44	2227
	Jupiter W.	108 37 36	2184	110 26 27	2177	112 15 29	2172	114 4 39	2166
	Aldebaran W.	84 50 25	2134	86 40 32	2127	88 30 50	2120	90 21 18	2115
17	Pollux W.	41 5 8	2211	42 53 19	2200	44 41 47	2189	46 30 32	2179
	Spica E.	49 45 48	2194	47 57 12	2191	46 8 30	2189	44 19 46	2187
	Antares E.	95 39 23	2181	93 50 27	2174	92 1 21	2168	90 12 5	2163
	Saturn E.	113 57 26	2157	112 7 53	2149	110 18 9	2143	108 28 16	2137
	Aldebaran W.	99 35 25	2096	101 26 30	2094	103 17 38	2093	105 8 48	2092
	Pollux W.	55 37 26	2145	57 27 16	2141	59 17 12	2138	61 7 13	2136
	Regulus W.	19 30 52	2119	21 21 22	2114	23 12 0	2110	25 2 44	2107
	Spica E.	35 16 22	2205	33 28 2	2215	31 39 56	2227	29 52 9	2242
	Antares E.	81 3 59	2145	79 14 8	2143	77 24 15	2143	75 34 21	2143
	Saturn E.	99 16 57	2118	97 26 26	2116	95 35 51	2115	93 45 15	2114
	$\alpha$ Aquilæ E.	123 47 47	3002	122 17 37	2964	120 46 39	2930	119 14 58	2899



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
10	<i>α</i> Pegasi W.	87 3 27 3168	88 30 14 3152	89 57 21 3136	91 24 47 3120				
	<i>α</i> Arietis W.	43 26 13 3119	44 54 0 3085	46 22 28 3052	47 51 36 3022				
	Jupiter W.	34 10 25 2864	35 43 30 2845	37 16 59 2827	38 50 52 2809				
	Pollux E.	35 30 52 2898	33 58 31 2892	32 26 2 2887	30 53 26 2884				
	Regulus E.	70 46 6 2792	69 11 27 2777	67 36 29 2760	66 1 9 2744				
11	SUN W.	126 56 19 3012	128 26 17 2994	129 56 37 2975	131 27 21 2957				
	<i>α</i> Pegasi W.	98 46 35 3047	100 15 50 3034	101 45 20 3021	103 15 7 3009				
	<i>α</i> Arietis W.	55 26 21 2883	56 59 2 2857	58 32 16 2833	60 6 1 2808				
	Jupiter W.	46 46 12 2717	48 22 29 2699	49 59 10 2681	51 36 16 2662				
	Aldebaran W.	22 16 25 2665	23 53 52 2647	25 31 43 2629	27 9 59 2611				
	Pollux E.	23 10 26 2911	21 38 21 2932	20 6 43 2965	18 35 47 3012				
	Regulus E.	57 59 4 2661	56 21 32 2643	54 43 36 2626	53 5 17 2609				
	Spica E.	111 47 48 2697	110 11 4 2678	108 33 55 2661	106 56 22 2643				
12	<i>α</i> Pegasi W.	110 47 27 2961	112 18 29 2954	113 49 40 2948	115 20 58 2945				
	<i>α</i> Arietis W.	68 2 34 2694	69 39 22 2672	71 16 39 2652	72 54 23 2631				
	Jupiter W.	59 47 57 2570	61 27 33 2553	63 7 32 2535	64 47 57 2517				
	Aldebaran W.	35 27 30 2520	37 8 16 2502	38 49 26 2484	40 31 1 2467				
	Regulus E.	44 47 47 2522	43 7 5 2505	41 25 59 2489	39 44 30 2472				
	Spica E.	98 42 28 2552	97 2 26 2535	95 22 1 2516	93 41 10 2499				
13	<i>α</i> Arietis W.	81 9 51 2536	82 50 14 2519	84 31 1 2502	86 12 11 2486				
	Jupiter W.	73 16 9 2431	74 58 59 2414	76 42 13 2398	78 25 51 2383				
	Aldebaran W.	49 5 2 2382	50 49 2 2366	52 33 26 2350	54 18 13 2334				
	Regulus E.	31 11 13 2391	29 27 26 2377	27 43 18 2362	25 58 49 2348				
	Spica E.	85 10 57 2415	83 27 43 2399	81 44 7 2383	80 0 8 2368				
14	<i>α</i> Arietis W.	94 43 28 2414	96 26 43 2402	98 10 15 2390	99 54 4 2379				
	Jupiter W.	87 9 27 2309	88 55 13 2296	90 41 19 2283	92 27 43 2270				
	Aldebaran W.	63 7 43 2261	64 54 40 2247	66 41 57 2235	68 29 33 2222				
	Pollux W.	20 8 18 2550	21 48 22 2494	23 29 43 2448	25 12 9 2409				
	Spica E.	71 14 56 2298	69 28 54 2286	67 42 34 2274	65 55 57 2263				
15	<i>α</i> Arietis W.	108 36 35 2339	110 21 37 2334	112 6 47 2330	113 52 3 2327				
	Jupiter W.	101 24 6 2216	103 12 9 2208	105 0 25 2199	106 48 55 2191				
	Aldebaran W.	77 31 58 2167	79 21 15 2158	81 10 45 2149	83 0 29 2141				
	Pollux W.	33 56 12 2275	35 42 48 2257	37 29 51 2241	39 17 18 2225				
	Spica E.	56 58 58 2216	55 10 55 2209	53 22 41 2204	51 34 19 2198				
	Antares E.	102 52 57 2216	101 4 54 2207	99 16 37 2198	97 28 6 2190				
16	Jupiter W.	115 53 58 2162	117 43 23 2158	119 32 54 2154	121 22 31 2152				
	Aldebaran W.	92 11 54 2110	94 2 38 2106	95 53 28 2102	97 44 24 2099				
	Pollux W.	48 19 32 2170	50 8 44 2162	51 58 9 2156	53 47 43 2150				
	Spica E.	42 30 59 2188	40 42 14 2190	38 53 31 2193	37 4 53 2198				
	Antares E.	88 22 41 2157	86 33 9 2153	84 43 30 2150	82 53 47 2147				
	Saturn E.	106 38 14 2132	104 48 4 2128	102 57 47 2124	101 7 25 2120				
17	Aldebaran W.	106 59 59 2092	108 51 10 2093	110 42 20 2094	112 33 28 2096				
	Pollux W.	62 57 18 2134	64 47 25 2133	66 37 33 2133	68 27 41 2134				
	Regulus W.	26 53 33 2105	28 44 25 2103	30 35 19 2103	32 26 13 2104				
	Spica E.	28 4 44 2262	26 17 48 2287	24 31 29 2317	22 45 54 2356				
	Antares E.	73 44 28 2144	71 54 36 2145	70 4 46 2148	68 15 0 2151				
	Saturn E.	91 54 37 2114	90 3 59 2114	88 13 22 2115	86 22 46 2117				
	<i>α</i> Aquilæ E.	117 42 38 2272	116 9 43 2248	114 36 17 2227	113 2 24 2208				



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
18	Pollux W.	70 17 48	2135	72 7 53	2137	73 57 55	2140	75 47 53	2143
	Regulus W.	34 17 6	2106	36 7 56	2107	37 58 44	2110	39 49 27	2113
	Antares E.	66 25 19	2155	64 35 44	2159	62 46 15	2165	60 56 55	2171
	Saturn E.	84 32 13	2119	82 41 43	2122	80 51 18	2126	79 0 58	2130
	$\alpha$ Aquilæ E.	111 28 7	2793	109 53 30	2779	108 18 35	2768	106 43 25	2759
19	Pollux W.	84 56 10	2169	86 45 25	2175	88 34 30	2182	90 23 25	2190
	Regulus W.	49 1 30	2139	50 51 30	2145	52 41 20	2152	54 31 0	2159
	Antares E.	51 52 58	2214	50 4 51	2226	48 17 2	2238	46 29 30	2251
	Saturn E.	69 51 2	2157	68 1 29	2163	66 12 6	2170	64 22 54	2178
	$\alpha$ Aquilæ E.	98 45 35	2744	97 9 53	2745	95 34 13	2749	93 58 38	2754
	SUN E.	133 33 44	2450	131 51 21	2457	130 9 7	2465	128 27 4	2472
20	Pollux W.	99 24 52	2234	101 12 29	2244	102 59 51	2255	104 46 57	2265
	Regulus W.	63 36 20	2202	65 24 45	2212	67 12 55	2221	69 0 51	2231
	Antares E.	37 37 19	2336	35 52 12	2358	34 7 37	2383	32 23 37	2410
	Saturn E.	55 19 56	2221	53 32 0	2231	51 44 19	2241	49 56 53	2251
	$\alpha$ Aquilæ E.	86 2 58	2800	84 28 30	2813	82 54 19	2828	81 20 58	2843
	SUN E.	119 59 44	2517	118 18 55	2527	116 38 20	2538	114 57 0	2548
21	Pollux W.	113 38 26	2323	115 23 52	2335	117 9 0	2348	118 53 50	2361
	Regulus W.	77 56 44	2284	79 43 7	2296	81 29 13	2306	83 15 4	2317
	Spica W.	24 54 51	2470	26 36 46	2459	28 18 57	2453	30 1 17	2449
	Saturn E.	41 3 33	2305	39 17 41	2317	37 32 6	2328	35 46 47	2340
	$\alpha$ Aquilæ E.	73 36 50	2944	72 5 27	2969	70 34 35	2995	69 4 16	3023
	SUN E.	106 40 6	2605	105 1 18	2617	103 22 46	2630	101 44 32	2643
22	Regulus W.	92 0 7	2375	93 44 17	2387	95 28 11	2398	97 11 48	2410
	Spica W.	38 33 16	2459	40 15 27	2464	41 57 31	2471	43 39 25	2478
	Saturn E.	27 4 32	2400	25 20 58	2412	23 37 41	2426	21 54 43	2438
	$\alpha$ Aquilæ E.	61 42 2	3192	60 15 43	3232	58 50 12	3276	57 25 32	3322
	SUN E.	93 37 28	2704	92 0 54	2717	90 24 36	2729	88 48 34	2742
23	Spica W.	52 6 17	2519	53 47 4	2528	55 27 39	2537	57 8 1	2546
	$\alpha$ Aquilæ E.	50 36 49	3610	49 18 26	3682	48 1 20	3761	46 45 37	3846
	SUN E.	80 52 36	2804	79 18 14	2816	77 44 7	2829	76 10 17	2841
24	Spica W.	65 26 35	2593	67 5 39	2604	68 44 29	2613	70 23 6	2622
	Antares W.	20 39 33	2944	22 10 56	2902	23 43 12	2870	25 16 9	2847
	SUN E.	68 24 59	2901	66 52 41	2913	65 20 39	2924	63 48 51	2936
25	Spica W.	78 32 58	2670	80 10 18	2679	81 47 26	2689	83 24 21	2698
	Antares W.	33 6 26	2793	34 41 3	2791	36 15 43	2789	37 50 25	2789
	SUN E.	56 13 28	2992	54 43 5	3004	53 12 57	3014	51 43 2	3025
26	Spica W.	91 25 51	2744	93 1 33	2753	94 37 3	2762	96 12 21	2771
	Antares W.	45 43 32	2802	47 17 58	2806	48 52 18	2811	50 26 32	2816
	Saturn W.	26 12 0	2737	27 47 51	2745	29 23 31	2753	30 59 0	2762
	SUN E.	44 16 48	3079	42 48 13	3090	41 19 51	3101	39 51 42	3111
27	Spica W.	104 5 55	2815	105 40 4	2824	107 14 1	2833	108 47 46	2841
	Antares W.	58 15 59	2844	59 49 30	2850	61 22 53	2857	62 56 7	2863
	Saturn W.	38 53 42	2802	40 28 7	2811	42 2 21	2818	43 36 25	2827
	SUN E.	32 34 15	3166	31 7 25	3178	29 40 50	3190	28 14 29	3203



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
18	Pollux W.	77 37 46	2147	79 27 33	2151	81 17 14	2157	83 6 46	2163
	Regulus W.	41 40 6	2118	43 30 38	2122	45 21 3	2127	47 11 21	2133
	Antares E.	59 7 44	2178	57 18 44	2186	55 29 55	2195	53 41 20	2204
	Saturn E.	77 10 44	2134	75 20 37	2139	73 30 37	2144	71 40 45	2150
	$\alpha$ Aquilæ E.	105 8 4	2753	103 32 34	2748	101 56 58	2745	100 21 17	2743
19	Pollux W.	92 12 8	2198	94 0 39	2206	95 48 57	2216	97 37 1	2225
	Regulus W.	56 20 29	2168	58 9 45	2175	59 58 50	2184	61 47 42	2193
	Antares E.	44 42 18	2265	42 55 27	2281	41 8 59	2298	39 22 56	2316
	Saturn E.	62 33 53	2186	60 45 4	2194	58 56 28	2204	57 8 6	2212
	$\alpha$ Aquilæ E.	92 23 10	2760	90 47 50	2768	89 12 40	2777	87 37 42	2788
	SUN E.	126 45 11	2481	125 3 31	2489	123 22 2	2499	121 40 47	2507
20	Pollux W.	106 33 48	2276	108 20 23	2287	110 6 41	2299	111 52 42	2311
	Regulus W.	70 48 33	2241	72 35 59	2251	74 23 10	2262	76 10 5	2273
	Antares E.	30 40 16	2440	28 57 39	2475	27 15 50	2515	25 34 57	2561
	Saturn E.	48 9 41	2262	46 22 45	2272	44 36 5	2283	42 49 41	2294
	$\alpha$ Aquilæ E.	79 46 55	2861	78 13 46	2880	76 41 1	2900	75 8 42	2921
	SUN E.	113 17 54	2560	111 38 4	2571	109 58 29	2582	108 19 10	2593
21	Pollux W.	120 38 21	2373	122 22 34	2387	124 6 27	2401	125 50 1	2415
	Regulus W.	85 0 38	2329	86 45 55	2341	88 30 55	2352	90 15 39	2363
	Spica W.	31 43 42	2448	33 26 9	2448	35 8 36	2451	36 50 59	2455
	Saturn E.	34 1 46	2351	32 17 1	2364	30 32 34	2375	28 48 24	2388
	$\alpha$ Aquilæ E.	67 34 32	3052	66 5 24	3084	64 36 55	3118	63 9 7	3154
	SUN E.	100 6 35	2654	98 28 53	2666	96 51 28	2679	95 14 20	2691
22	Regulus W.	98 55 9	2421	100 38 13	2433	102 21 0	2444	104 3 32	2456
	Spica W.	45 21 9	2485	47 2 43	2493	48 44 6	2501	50 25 18	2510
	Saturn E.	20 12 3	2452	18 29 42	2466	16 47 41	2480	15 6 0	2496
	$\alpha$ Aquilæ E.	56 1 46	3371	54 38 57	3425	53 17 9	3482	51 56 25	3544
	SUN E.	87 12 50	2754	85 37 22	2766	84 2 10	2779	82 27 15	2791
23	Spica W.	58 48 10	2556	60 28 6	2565	62 7 49	2575	63 47 18	2584
	$\alpha$ Aquilæ E.	45 31 22	2938	44 18 41	4039	43 7 40	4151	41 58 27	4273
	SUN E.	74 36 42	2853	73 3 23	2866	71 30 20	2877	69 57 32	2889
24	Spica W.	72 1 31	2632	73 39 42	2642	75 17 40	2651	76 55 26	2661
	Antares W.	26 49 36	2829	28 23 26	2815	29 57 34	2805	31 31 56	2798
	SUN E.	62 17 18	2947	60 45 59	2958	59 14 54	2970	57 44 4	2981
25	Spica W.	85 1 3	2707	86 37 34	2716	88 13 52	2726	89 49 57	2735
	Antares W.	39 25 7	2790	40 59 48	2792	42 34 26	2795	44 9 1	2798
	SUN E.	50 13 20	3036	48 43 52	3047	47 14 37	3058	45 45 36	3069
26	Spica W.	97 47 27	2779	99 22 22	2788	100 57 5	2798	102 31 36	2807
	Antares W.	52 0 39	2821	53 34 40	2826	55 8 34	2832	56 42 20	2838
	Saturn W.	32 34 18	2770	34 9 25	2778	35 44 22	2787	37 19 7	2795
	SUN E.	38 23 46	3122	36 56 3	3133	35 28 34	3144	34 1 17	3156
27	Spica W.	110 21 20	2850	111 54 43	2859	113 27 54	2868	115 0 54	2877
	Antares W.	64 29 14	2870	66 2 12	2876	67 35 2	2882	69 7 44	2889
	Saturn W.	45 10 18	2834	46 44 2	2842	48 17 35	2850	49 50 58	2858
	SUN E.	26 48 23	3216	25 22 33	3229	23 56 58	3243	22 31 40	3259



Day of the Month.	AYER's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1°08666	1°60154	0°00318	1°46645	87°098	<sup>h</sup> <sup>m</sup> <sup>s</sup> 3 13 30°52
2	1°07800	1°59882	0°00432	1°46605	87°652	3 9 34°61
3	1°06933	1°59604	0°00544	1°46565	88°207	3 5 38°70
4	1°06064	1°59319	0°00654	1°46524	88°764	3 1 42°79
5	1°05194	1°59027	0°00763	1°46483	89°323	2 57 46°88
6	1°04324	1°58728	0°00871	1°46443	89°883	2 53 50°97
7	1°03454	1°58423	0°00977	1°46403	90°441	2 49 55°06
8	1°02584	1°58111	0°01081	1°46363	90°999	2 45 59°15
9	1°01715	1°57792	0°01183	1°46323	91°555	2 42 3°25
10	1°00847	1°57467	0°01284	1°46283	92°113	2 38 7°34
11	0°99983	1°57134	0°01383	1°46243	92°671	2 34 11°43
12	0°99123	1°56795	0°01481	1°46204	93°227	2 30 15°52
13	0°98268	1°56448	0°01578	1°46165	93°783	2 26 19°61
14	0°97419	1°56094	0°01673	1°46126	94°338	2 22 23°70
15	0°96574	1°55734	0°01767	1°46088	94°890	2 18 27°80
16	0°95736	1°55367	0°01859	1°46050	95°441	2 14 31°89
17	0°94906	1°54992	0°01950	1°46012	95°991	2 10 35°98
18	0°94085	1°54611	0°02041	1°45975	96°538	2 6 40°08
19	0°93275	1°54222	0°02130	1°45938	97°083	2 2 44°17
20	0°92475	1°53826	0°02217	1°45902	97°626	1 58 48°26
21	0°91687	1°53423	0°02303	1°45867	98°167	1 54 52°35
22	0°90914	1°53012	0°02388	1°45832	98°704	1 50 56°44
23	0°90155	1°52595	0°02472	1°45798	99°238	1 47 0°53
24	0°89411	1°52170	0°02554	1°45764	99°770	1 43 4°63
25	0°88684	1°51737	0°02635	1°45731	100°299	1 39 8°72
26	0°87976	1°51297	0°02716	1°45699	100°823	1 35 12°81
27	0°87288	1°50850	0°02796	1°45667	101°341	1 31 16°91
28	0°86622	1°50396	0°02875	1°45636	101°856	1 27 21°00
29	0°85978	1°49933	0°02953	1°45606	102°367	1 23 25°09



Day of the Month.	BESSEL'S Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>s</sup> .027465. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	-1.1069	+1.1747	-9.2848	+0.6306	2404095	316	31	.0849
2	1.1150	1.1674	9.2788	0.6279	2404096	317	32	.0876
3	1.1228	1.1599	9.2728	0.6250	2404097	318	33	.0904
4	-1.1304	+1.1520	-9.2668	+0.6222	2404098	319	34	.0931
5	1.1377	1.1439	9.2607	0.6194	2404099	320	35	.0958
6	1.1447	1.1355	9.2547	0.6166	2404100	321	36	.0986
7	-1.1514	+1.1268	-9.2486	+0.6137	2404101	322	37	.1013
8	1.1580	1.1178	9.2426	0.6109	2404102	323	38	.1040
9	1.1643	1.1085	9.2365	0.6080	2404103	324	39	.1068
10	-1.1704	+1.0988	-9.2305	+0.6052	2404104	325	40	.1095
11	1.1762	1.0888	9.2244	0.6023	2404105	326	41	.1123
12	1.1818	1.0784	9.2183	0.5994	2404106	327	42	.1150
13	-1.1873	+1.0676	-9.2122	+0.5966	2404107	328	43	.1177
14	1.1925	1.0564	9.2061	0.5937	2404108	329	44	.1205
15	1.1975	1.0448	9.2000	0.5909	2404109	330	45	.1232
16	-1.2024	+1.0327	-9.1938	+0.5881	2404110	331	46	.1259
17	1.2070	1.0202	9.1877	0.5853	2404111	332	47	.1287
18	1.2115	1.0071	9.1815	0.5825	2404112	333	48	.1314
19	-1.2158	+0.9935	-9.1754	+0.5797	2404113	334	49	.1342
20	1.2199	0.9793	9.1692	0.5770	2404114	335	50	.1369
21	1.2238	0.9645	9.1630	0.5743	2404115	336	51	.1396
22	-1.2276	+0.9491	-9.1568	+0.5716	2404116	337	52	.1424
23	1.2312	0.9330	9.1506	0.5689	2404117	338	53	.1451
24	1.2346	0.9161	9.1444	0.5663	2404118	339	54	.1478
25	-1.2379	+0.8984	-9.1381	+0.5637	2404119	340	55	.1506
26	1.2410	0.8798	9.1318	0.5612	2404120	341	56	.1533
27	1.2440	0.8602	9.1255	0.5587	2404121	342	57	.1561
28	1.2468	0.8396	9.1192	0.5563	2404122	343	58	.1588
29	-1.2494	+0.8178	-9.1128	+0.5539	2404123	344	59	.1615

\* Add .0026 if Fraction be required for the time 4, see page 329.

\* Add .0026 if Fraction be required for the time  $t$ , see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	22 48 55.63	9.361	S. 7 32 33.3	57.01	1 5.40	12 32.38	0.494
Wed.	2	22 52 40.04	9.340	7 9 41.8	57.27	1 5.33	12 20.26	0.515
Thur.	3	22 56 23.96	9.320	6 46 44.4	57.51	1 5.26	12 7.65	0.535
Frid.	4	23 0 7.39	9.300	6 23 41.2	57.74	1 5.20	11 54.57	0.555
Sat.	5	23 3 50.37	9.281	6 0 32.7	57.95	1 5.13	11 41.03	0.573
Sun.	6	23 7 32.90	9.263	5 37 19.4	58.15	1 5.07	11 27.05	0.591
Mon.	7	23 11 15.01	9.246	5 14 1.6	58.33	1 5.01	11 12.65	0.609
Tues.	8	23 14 56.71	9.230	4 50 39.6	58.49	1 4.96	10 57.84	0.625
Wed.	9	23 18 38.02	9.214	4 27 14.0	58.64	1 4.90	10 42.64	0.641
Thur.	10	23 22 18.96	9.199	4 3 45.1	58.76	1 4.85	10 27.07	0.656
Frid.	11	23 25 59.56	9.185	3 40 13.3	58.87	1 4.80	10 11.16	0.669
Sat.	12	23 29 39.83	9.171	3 16 39.0	58.97	1 4.76	9 54.92	0.683
Sun.	13	23 33 19.78	9.158	2 53 2.6	59.05	1 4.72	9 38.36	0.696
Mon.	14	23 36 59.43	9.147	2 29 24.4	59.12	1 4.68	9 21.50	0.708
Tues.	15	23 40 38.82	9.136	2 5 44.9	59.17	1 4.64	9 4.38	0.718
Wed.	16	23 44 17.96	9.126	1 42 4.3	59.21	1 4.61	8 47.02	0.728
Thur.	17	23 47 56.88	9.118	1 18 23.0	59.23	1 4.58	8 29.44	0.736
Frid.	18	23 51 35.61	9.110	0 54 41.3	59.24	1 4.55	8 11.68	0.744
Sat.	19	23 55 14.18	9.104	0 30 59.6	59.23	1 4.53	7 53.74	0.750
Sun.	20	23 58 52.61	9.099	S. 0 7 18.3	59.21	1 4.51	7 35.66	0.756
Mon.	21	0 2 30.92	9.094	N. 0 16 22.4	59.18	1 4.49	7 17.46	0.760
Tues.	22	0 6 9.13	9.091	0 40 2.3	59.13	1 4.47	6 59.18	0.763
Wed.	23	0 9 47.29	9.089	1 3 40.8	59.07	1 4.46	6 40.83	0.765
Thur.	24	0 13 25.40	9.087	1 27 17.6	58.99	1 4.45	6 22.44	0.767
Frid.	25	0 17 3.48	9.086	1 50 52.5	58.90	1 4.44	6 4.02	0.768
Sat.	26	0 20 41.54	9.086	2 14 24.9	58.79	1 4.44	5 45.59	0.768
Sun.	27	0 24 19.60	9.087	2 37 54.6	58.67	1 4.44	5 27.15	0.768
Mon.	28	0 27 57.70	9.088	3 1 21.2	58.54	1 4.45	5 8.73	0.766
Tues.	29	0 31 35.84	9.090	3 24 44.4	58.39	1 4.45	4 50.36	0.764
Wed.	30	0 35 14.04	9.093	3 48 3.7	58.22	1 4.46	4 32.07	0.761
Thur.	31	0 38 52.31	9.096	4 11 18.9	58.04	1 4.47	4 13.84	0.758
Frid.	32	0 42 30.67	9.100	N. 4 34 29.5	57.84	1 4.49	3 55.70	0.754

\* Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subtracted from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		h m s	° ' "	' "	m s	h m s
Tues.	1	22 48 53.68	S. 7 32 45.2	16 10.1	12 32.48	22 36 21.20
Wed.	2	22 52 38.12	7 9 53.6	16 9.8	12 20.36	22 40 17.76
Thur.	3	22 56 22.07	6 46 56.0	16 9.6	12 7.76	22 44 14.31
Frid.	4	23 0 5.54	6 23 52.7	16 9.4	11 54.68	22 48 10.86
Sat.	5	23 3 48.56	6 0 44.0	16 9.1	11 41.14	22 52 7.42
Sun.	6	23 7 31.13	5 37 30.5	16 8.9	11 27.16	22 56 3.97
Mon.	7	23 11 13.28	5 14 12.5	16 8.6	11 12.76	23 0 0.52
Tues.	8	23 14 55.02	4 50 50.3	16 8.3	10 57.95	23 3 57.07
Wed.	9	23 18 36.38	4 27 24.4	16 8.1	10 42.75	23 7 53.63
Thur.	10	23 22 17.36	4 3 55.3	16 7.8	10 27.18	23 11 50.18
Frid.	11	23 25 58.00	3 40 23.3	16 7.6	10 11.27	23 15 46.73
Sat.	12	23 29 38.31	3 16 48.8	16 7.3	9 55.03	23 19 43.28
Sun.	13	23 33 18.30	2 53 12.1	16 7.1	9 38.47	23 23 39.83
Mon.	14	23 36 58.00	2 29 33.6	16 6.8	9 21.61	23 27 36.39
Tues.	15	23 40 37.43	2 5 53.8	16 6.5	9 4.49	23 31 32.94
Wed.	16	23 44 16.62	1 42 12.9	16 6.3	8 47.13	23 35 29.49
Thur.	17	23 47 55.59	1 18 31.3	16 6.0	8 29.55	23 39 26.04
Frid.	18	23 51 34.37	0 54 49.4	16 5.7	8 11.78	23 43 22.59
Sat.	19	23 55 12.99	0 31 7.4	16 5.5	7 53.84	23 47 19.15
Sun.	20	23 58 51.46	S. 0 7 25.8	16 5.2	7 35.76	23 51 15.70
Mon.	21	0 2 29.81	N. 0 16 15.2	16 4.9	7 17.56	23 55 12.25
Tues.	22	0 6 8.07	0 39 55.4	16 4.6	6 59.27	23 59 8.80
Wed.	23	0 9 46.27	1 3 34.2	16 4.3	6 40.91	0 3 5.36
Thur.	24	0 13 24.43	1 27 11.3	16 4.1	6 22.52	0 7 1.91
Frid.	25	0 17 2.56	1 50 46.5	16 3.8	6 4.10	0 10 58.46
Sat.	26	0 20 40.67	2 14 19.3	16 3.5	5 45.66	0 14 55.01
Sun.	27	0 24 18.78	2 37 49.3	16 3.2	5 27.22	0 18 51.56
Mon.	28	0 27 56.92	3 1 16.2	16 2.9	5 8.80	0 22 48.12
Tues.	29	0 31 35.10	3 24 39.6	16 2.7	4 50.43	0 26 44.67
Wed.	30	0 35 13.35	3 47 59.3	16 2.4	4 32.13	0 30 41.22
Thur.	31	0 38 51.67	4 11 14.8	16 2.1	4 13.90	0 34 37.77
Frid.	32	0 42 30.07	N. 4 34 25.7	16 1.8	3 55.75	0 38 34.32

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	340° 44' 10" 0	S. 0° 42'	9.9962823	15' 1" 1	14' 58" 1	55' 1" 5	54' 50" 3
2	341° 44' 19" 6	0° 52'	9.9963924	14' 55" 3	14' 52" 7	54' 40" 0	54' 30" 6
3	342° 44' 27" 4	0° 60'	9.9965029	14' 50" 4	14' 48" 4	54' 22" 3	54' 15" 1
4	343° 44' 33" 2	0° 65'	9.9966139	14' 46" 8	14' 45" 6	54' 9" 2	54' 4" 7
5	344° 44' 37" 1	0° 68'	9.9967253	14' 44" 8	14' 44" 5	54' 1" 8	54' 0" 7
6	345° 44' 39" 0	0° 69'	9.9968372	14' 44" 7	14' 45" 5	54' 1" 4	54' 4" 1
7	346° 44' 38" 8	0° 68'	9.9969496	14' 46" 8	14' 48" 7	54' 9" 0	54' 16" 1
8	347° 44' 36" 6	0° 64'	9.9970625	14' 51" 3	14' 54" 6	54' 25" 6	54' 37" 5
9	348° 44' 32" 2	0° 57'	9.9971760	14' 58" 5	15' 3" 1	54' 51" 9	55' 8" 7
10	349° 44' 25" 6	0° 49'	9.9972903	15' 8" 3	15' 14" 2	55' 27" 8	55' 49" 2
11	350° 44' 16" 9	0° 39'	9.9974053	15' 20" 6	15' 27" 5	56' 12" 8	56' 38" 2
12	351° 44' 5" 9	0° 28'	9.9975211	15' 34" 9	15' 42" 6	57' 5" 2	57' 33" 3
13	352° 43' 52" 6	0° 15'	9.9976378	15' 50" 5	15' 58" 4	58' 2" 2	58' 31" 3
14	353° 43' 37" 1	S. 0° 02'	9.9977554	16' 6" 2	16' 13" 7	58' 59" 9	59' 27" 3
15	354° 43' 19" 3	N. 0° 10'	9.9978741	16' 20" 7	16' 27" 0	59' 52" 9	60' 16" 0
16	355° 42' 59" 4	0° 21'	9.9979940	16' 32" 4	16' 36" 7	60' 35" 8	60' 51" 8
17	356° 42' 37" 3	0° 29'	9.9981151	16' 39" 9	16' 41" 9	61' 3" 5	61' 10" 6
18	357° 42' 13" 2	0° 35'	9.9982374	16' 42" 5	16' 41" 8	61' 12" 9	61' 10" 3
19	358° 41' 47" 3	0° 37'	9.9983609	16' 39" 8	16' 36" 7	61' 3" 1	60' 51" 6
20	359° 41' 19" 4	0° 35'	9.9984855	16' 32" 5	16' 27" 5	60' 36" 3	60' 17" 8
21	0° 40' 49" 7	0° 29'	9.9986109	16' 21" 7	16' 15" 4	59' 56" 7	59' 33" 5
22	1° 40' 18" 3	0° 21'	9.9987370	16' 8" 7	16' 1" 8	59' 9" 1	58' 43" 9
23	2° 39' 45" 2	N. 0° 10'	9.9988637	15' 54" 9	15' 48" 0	58' 18" 5	57' 53" 3
24	3° 39' 10" 5	S. 0° 02'	9.9989907	15' 41" 3	15' 34" 9	57' 28" 7	57' 5" 1
25	4° 38' 34" 1	0° 14'	9.9991179	15' 28" 8	15' 23" 0	56' 42" 7	56' 21" 5
26	5° 37' 55" 8	0° 28'	9.9992451	15' 17" 6	15' 12" 6	56' 1" 8	55' 43" 6
27	6° 37' 15" 8	0° 39'	9.9993721	15' 8" 1	15' 3" 9	55' 27" 0	55' 11" 8
28	7° 36' 33" 8	0° 51'	9.9994989	15' 0" 2	14' 56" 9	54' 58" 1	54' 45" 9
29	8° 35' 50" 0	0° 62'	9.9996254	14' 53" 9	14' 51" 3	54' 35" 1	54' 25" 6
30	9° 35' 4" 4	0° 70'	9.9997515	14' 49" 1	14' 47" 2	54' 17" 5	54' 10" 6
31	10° 34' 16" 8	0° 75'	9.9998770	14' 45" 7	14' 44" 5	54' 5" 0	54' 0" 7
32	11° 33' 27" 1	S. 0° 78'	0.0000019	14' 43" 7	14' 43" 2	53' 57" 7	53' 55" 9



## MEAN TIME.

## THE MOON'S

		THE MOON'S														
Day of the Week.	Day of the Month.	Longitude.				Latitude.				Age.		Meridian				
		Noon.		Midnight.		Noon.		Midnight.		Noon.	Passage.					
		°	'	"	°	'	"	°	'	"	°	'	"	d	h	m
Tues.	1	331	3	57.8	337	11	41.8	S.2	49	24.5	S.3	15	59.9	28.8		6
Wed.	2	343	17	23.7	349	21	11.3	3	40	9.3	4	1	39.4	0.1	0	24.6
Thur.	3	355	23	12.9	1	23	37.5	4	20	18.8	4	35	58.2	1.1	1	7.7
Frid.	4	7	22	35.5	13	20	19.2	4	48	30.7	4	57	50.6	2.1	1	49.6
Sat.	5	19	17	2.6	25	13	2.0	5	3	54.6	5	6	40.7	3.1	2	31.0
Sun.	6	31	8	36.7	37	4	7.9	5	6	8.5	5	2	18.8	4.1	3	12.5
Mon.	7	43	0	0.3	48	56	40.6	4	55	13.7	4	44	56.3	5.1	3	55.1
Tues.	8	54	54	38.5	60	54	25.9	4	31	30.7	4	15	2.1	6.1	4	39.3
Wed.	9	66	56	36.6	73	1	46.2	3	55	36.7	3	33	21.7	7.1	5	25.7
Thur.	10	79	10	31.4	85	23	29.3	3	8	26.1	2	41	0.2	8.1	6	14.8
Frid.	11	91	41	16.4	98	4	28.5	2	11	16.4	1	39	29.6	9.1	7	6.5
Sat.	12	104	33	38.4	111	9	15.4	S.1	5	57.4	S.0	31	0.7	10.1	8	0.6
Sun.	13	117	51	43.7	124	41	20.3	N.0	4	56.1	N.0	41	24.7	11.1	8	56.3
Mon.	14	131	38	13.7	138	42	22.2	1	17	53.1	1	53	45.1	12.1	9	52.6
Tues.	15	145	53	32.3	153	11	17.8	2	28	22.3	3	1	3.3	13.1	10	48.8
Wed.	16	160	34	59.4	168	3	44.5	3	31	6.5	3	57	51.2	14.1	11	44.3
Thur.	17	175	36	28.9	183	11	59.1	4	20	39.9	4	39	0.0	15.1	12	39.2
Frid.	18	190	48	54.7	198	25	52.5	4	52	25.6	5	0	39.4	16.1	13	33.7
Sat.	19	206	1	30.2	213	34	30.0	5	3	32.9	5	1	7.3	17.1	14	28.4
Sun.	20	221	3	42.4	228	28	8.5	4	53	32.0	4	41	4.4	18.1	15	23.7
Mon.	21	235	47	1.9	242	59	49.1	4	24	8.0	4	3	11.1	19.1	16	19.6
Tues.	22	250	6	9.3	257	5	53.6	3	38	44.6	3	11	21.4	20.1	17	16.0
Wed.	23	263	59	3.8	270	45	50.4	2	41	34.9	2	9	57.2	21.1	18	12.1
Thur.	24	277	26	30.6	284	1	26.9	1	36	59.7	N.1	3	12.4	22.1	19	6.9
Frid.	25	290	31	5.5	296	55	54.2	N.0	29	3.0	S.0	5	2.3	23.1	19	59.7
Sat.	26	303	16	21.9	309	32	57.2	S.0	38	39.5	1	11	26.1	24.1	20	50.0
Sun.	27	315	46	7.7	321	56	19.3	1	43	1.5	2	13	6.5	25.1	21	37.6
Mon.	28	328	3	55.9	334	9	18.9	2	41	23.7	3	7	37.1	26.1	22	22.7
Tues.	29	340	12	47.3	346	14	38.0	3	31	32.1	3	52	55.7	27.1	23	6.0
Wed.	30	352	15	5.5	358	14	22.7	4	11	36.6	4	27	25.0	28.1	23	47.9
Thur.	31	4	12	40.5	10	10	9.2	4	40	12.7	4	49	53.5	29.1		6
Frid.	32	16	6	58.1	22	3	17.0	S.4	56	22.6	S.4	59	37.2	0.4	0	29.2



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 1.</b>				<b>THURSDAY 3.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	22 16 33.77	S. 13 44 25.3	88.50	0	23 49 59.12	S. 5 48 54.6	106.56
1	22 18 35.06	13 35 32.6	89.07	1	23 51 52.02	5 38 14.7	106.75
2	22 20 36.14	13 26 36.4	89.64	2	23 53 44.80	5 27 33.6	106.93
3	22 22 36.99	13 17 36.9	90.18	3	23 55 37.46	5 16 51.5	107.10
4	22 24 37.63	13 8 34.2	90.72	4	23 57 30.01	5 6 8.4	107.26
5	22 26 38.06	12 59 28.2	91.27	5	23 59 22.44	4 55 24.4	107.42
6	22 28 38.27	12 50 19.0	91.79	6	0 1 14.77	4 44 39.4	107.57
7	22 30 38.27	12 41 6.7	92.31	7	0 3 7.00	4 33 53.5	107.72
8	22 32 38.06	12 31 51.3	92.82	8	0 4 59.12	4 23 6.7	107.86
9	22 34 37.64	12 22 32.9	93.32	9	0 6 51.15	4 12 19.2	107.98
10	22 36 37.01	12 13 11.5	93.81	10	0 8 43.07	4 1 30.9	108.11
11	22 38 36.18	12 3 47.2	94.29	11	0 10 34.90	3 50 41.9	108.22
12	22 40 35.14	11 54 20.0	94.77	12	0 12 26.64	3 39 52.2	108.33
13	22 42 33.90	11 44 50.0	95.23	13	0 14 18.29	3 29 1.9	108.43
14	22 44 32.46	11 35 17.2	95.69	14	0 16 9.85	3 18 11.0	108.52
15	22 46 30.82	11 25 41.7	96.14	15	0 18 1.33	3 7 19.6	108.61
16	22 48 28.99	11 16 3.5	96.58	16	0 19 52.73	2 56 27.7	108.69
17	22 50 26.96	11 6 22.7	97.02	17	0 21 44.05	2 45 35.3	108.77
18	22 52 24.74	10 56 39.2	97.45	18	0 23 35.30	2 34 42.5	108.83
19	22 54 22.33	10 46 53.3	97.86	19	0 25 26.47	2 23 49.3	108.90
20	22 56 19.73	10 37 4.9	98.27	20	0 27 17.58	2 12 55.7	108.96
21	22 58 16.94	10 27 14.0	98.67	21	0 29 8.61	2 2 1.8	109.01
22	23 0 13.97	10 17 20.8	99.06	22	0 30 59.58	1 51 7.6	109.04
23	23 2 10.81	S. 10 7 25.3	99.45	23	0 32 50.49	S. 1 40 13.3	109.07
<b>WEDNESDAY 2.</b>				<b>FRIDAY 4.</b>			
0	23 4 7.48	S. 9 57 27.4	99.83	0	0 34 41.35	S. 1 29 18.7	109.11
1	23 6 3.97	9 47 27.3	100.20	1	0 36 32.15	1 18 24.0	109.13
2	23 8 0.28	9 37 25.0	100.56	2	0 38 22.89	1 7 29.2	109.14
3	23 9 56.41	9 27 20.6	100.91	3	0 40 13.58	0 56 34.3	109.16
4	23 11 52.38	9 17 14.1	101.26	4	0 42 4.23	0 45 39.3	109.16
5	23 13 48.17	9 7 5.5	101.60	5	0 43 54.83	0 34 44.4	109.14
6	23 15 43.80	8 56 54.9	101.93	6	0 45 45.39	0 23 49.6	109.13
7	23 17 39.26	8 46 42.4	102.24	7	0 47 35.91	0 12 54.8	109.12
8	23 19 34.56	8 36 28.0	102.56	8	0 49 26.40	S. 0 2 0.1	109.10
9	23 21 29.70	8 26 11.7	102.87	9	0 51 16.85	N. 0 8 54.4	109.07
10	23 23 24.68	8 15 53.5	103.17	10	0 53 7.27	0 19 48.7	109.03
11	23 25 19.50	8 5 33.6	103.46	11	0 54 57.66	0 30 42.7	108.98
12	23 27 14.17	7 55 12.0	103.74	12	0 56 48.03	0 41 36.5	108.93
13	23 29 8.69	7 44 48.7	104.02	13	0 58 38.38	0 52 29.9	108.88
14	23 31 3.06	7 34 23.8	104.28	14	1 0 28.71	1 3 23.0	108.82
15	23 32 57.28	7 23 57.3	104.55	15	1 2 19.02	1 14 15.7	108.74
16	23 34 51.36	7 13 29.2	104.80	16	1 4 9.32	1 25 7.9	108.67
17	23 36 45.30	7 2 59.7	105.04	17	1 5 59.62	1 35 59.7	108.59
18	23 38 39.10	6 52 28.7	105.28	18	1 7 49.90	1 46 51.0	108.50
19	23 40 32.77	6 41 56.3	105.52	19	1 9 40.18	1 57 41.7	108.41
20	23 42 26.30	6 31 22.5	105.74	20	1 11 30.46	2 8 31.9	108.31
21	23 44 19.70	6 20 47.4	105.96	21	1 13 20.74	2 19 21.4	108.19
22	23 46 12.97	6 10 11.0	106.17	22	1 15 11.03	2 30 10.2	108.08
23	23 48 6.11	5 59 33.4	106.37	23	1 17 1.32	2 40 58.4	107.97
24	23 49 59.12	S. 5 48 54.6	106.56	24	1 18 51.62	N. 2 51 45.8	107.84



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 5.</b>				<b>MONDAY 7.</b>			
0	<sup>h</sup> 18 <sup>m</sup> 51 <sup>s</sup> 62	N. 2 51 45.8	107.84	0	<sup>h</sup> 2 48 <sup>m</sup> 14 <sup>s</sup> 53	N. 11 3 22.1	94.63
1	1 20 41.94	3 2 32.5	107.72	1	2 50 8.83	11 12 48.6	94.31
2	1 22 32.27	3 13 18.4	107.58	2	2 52 3.29	11 22 12.6	93.77
3	1 24 22.62	3 24 3.4	107.43	3	2 53 57.90	11 31 33.9	93.33
4	1 26 12.99	3 34 47.5	107.28	4	2 55 52.66	11 40 52.6	92.89
5	1 28 3.38	3 45 30.7	107.13	5	2 57 47.59	11 50 8.6	92.44
6	1 29 53.81	3 56 13.0	106.97	6	2 59 42.67	11 59 21.9	91.98
7	1 31 44.26	4 6 54.3	106.80	7	3 1 37.92	12 8 32.4	91.52
8	1 33 34.75	4 17 34.6	106.63	8	3 3 33.34	12 17 40.1	91.05
9	1 35 25.27	4 28 13.8	106.44	9	3 5 28.92	12 26 45.0	90.57
10	1 37 15.83	4 38 51.9	106.25	10	3 7 24.67	12 35 47.0	90.08
11	1 39 6.44	4 49 28.8	106.05	11	3 9 20.60	12 44 46.0	89.58
12	1 40 57.09	5 0 4.5	105.86	12	3 11 16.70	12 53 42.0	89.09
13	1 42 47.79	5 10 39.1	105.66	13	3 13 12.98	13 2 35.1	88.59
14	1 44 38.54	5 21 12.4	105.44	14	3 15 9.44	13 11 25.1	88.08
15	1 46 29.34	5 31 44.4	105.23	15	3 17 6.08	13 20 12.0	87.56
16	1 48 20.21	5 42 15.1	105.01	16	3 19 2.91	13 28 55.8	87.03
17	1 50 11.13	5 52 44.5	104.78	17	3 20 59.93	13 37 38.4	86.50
18	1 52 2.11	6 3 12.5	104.54	18	3 22 57.14	13 46 13.8	85.97
19	1 53 53.16	6 13 39.0	104.30	19	3 24 54.54	13 54 48.0	85.43
20	1 55 44.27	6 24 4.1	104.06	20	3 26 52.13	14 3 18.9	84.88
21	1 57 35.46	6 34 27.7	103.80	21	3 28 49.92	14 11 46.5	84.32
22	1 59 26.72	6 44 49.7	103.54	22	3 30 47.91	14 20 10.7	83.75
23	2 1 18.06	N. 6 55 10.2	103.27	23	3 32 46.10	N. 14 28 31.5	83.17
<b>SUNDAY 6.</b>				<b>TUESDAY 8.</b>			
0	2 3 9.47	N. 7 5 29.0	103.00	0	3 34 44.49	N. 14 36 48.8	82.59
1	2 5 0.97	7 15 46.2	102.72	1	3 36 43.09	14 45 2.6	82.01
2	2 6 52.55	7 26 1.7	102.44	2	3 38 41.89	14 53 12.9	81.42
3	2 8 44.22	7 36 15.5	102.15	3	3 40 40.91	15 1 19.6	80.82
4	2 10 35.98	7 46 27.5	101.86	4	3 42 40.14	15 9 22.7	80.22
5	2 12 27.83	7 56 37.8	101.56	5	3 44 39.58	15 17 22.2	79.60
6	2 14 19.78	8 6 46.2	101.24	6	3 46 39.23	15 25 17.9	78.97
7	2 16 11.83	8 16 52.7	100.93	7	3 48 39.11	15 33 9.9	78.35
8	2 18 3.98	8 26 57.3	100.61	8	3 50 39.20	15 40 58.1	77.72
9	2 19 56.24	8 37 0.0	100.28	9	3 52 39.51	15 48 42.5	77.08
10	2 21 48.60	8 47 0.7	99.95	10	3 54 40.05	15 56 23.0	76.43
11	2 23 41.08	8 56 59.4	99.62	11	3 56 40.81	16 3 59.6	75.77
12	2 25 33.66	9 6 56.1	99.28	12	3 58 41.79	16 11 32.2	75.10
13	2 27 26.36	9 16 50.7	98.92	13	4 0 43.00	16 19 0.8	74.43
14	2 29 19.19	9 26 43.1	98.55	14	4 2 44.45	16 26 25.4	73.76
15	2 31 12.13	9 36 33.3	98.19	15	4 4 46.12	16 33 45.9	73.08
16	2 33 5.20	9 46 21.4	97.82	16	4 6 48.03	16 41 2.3	72.38
17	2 34 58.39	9 56 7.2	97.45	17	4 8 50.18	16 48 14.5	71.68
18	2 36 51.72	10 5 50.8	97.07	18	4 10 52.56	16 55 22.5	70.97
19	2 38 45.17	10 15 32.0	96.68	19	4 12 55.17	17 2 26.2	70.26
20	2 40 38.76	10 25 10.9	96.28	20	4 14 58.03	17 9 25.6	69.54
21	2 42 32.49	10 34 47.4	95.87	21	4 17 1.13	17 16 20.7	68.81
22	2 44 26.36	10 44 21.4	95.47	22	4 19 4.46	17 23 11.3	68.07
23	2 46 20.38	10 53 53.0	95.06	23	4 21 8.04	17 29 57.5	67.33
24	2 48 14.53	N. 11 3 22.1	94.63	24	4 23 11.87	N. 17 36 39.3	66.58



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 9.</b>				<b>FRIDAY 11.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	4 23 11.87	N.17 36 39.3	66.58	0	6 7 14.36	N.21 15 23.9	21.68
1	4 25 15.94	17 43 16.5	63.82	1	6 9 30.56	21 17 30.6	20.57
2	4 27 20.26	17 49 49.2	65.06	2	6 11 47.00	21 19 30.7	19.45
3	4 29 24.83	17 56 17.2	64.28	3	6 14 3.67	21 21 24.0	18.32
4	4 31 29.65	18 2 40.6	63.51	4	6 16 20.57	21 23 10.5	17.18
5	4 33 34.71	18 8 59.3	62.72	5	6 18 37.70	21 24 50.1	16.03
6	4 35 40.03	18 15 13.2	61.92	6	6 20 55.05	21 26 22.9	14.89
7	4 37 45.60	18 21 22.3	61.12	7	6 23 12.63	21 27 48.8	13.74
8	4 39 51.42	18 27 26.6	60.31	8	6 25 30.43	21 29 7.8	12.58
9	4 41 57.50	18 33 26.0	59.48	9	6 27 48.45	21 30 19.8	11.42
10	4 44 3.83	18 39 20.4	58.66	10	6 30 6.69	21 31 24.8	10.24
11	4 46 10.41	18 45 9.9	57.83	11	6 32 25.15	21 32 22.7	9.06
12	4 48 17.25	18 50 54.4	56.99	12	6 34 43.81	21 33 13.5	7.88
13	4 50 24.35	18 56 33.8	56.13	13	6 37 2.69	21 33 57.2	6.68
14	4 52 31.70	19 2 8.0	55.27	14	6 39 21.77	21 34 33.7	5.49
15	4 54 39.31	19 7 37.1	54.42	15	6 41 41.06	21 35 3.1	4.29
16	4 56 47.18	19 13 1.0	53.55	16	6 44 0.55	21 35 25.2	3.08
17	4 58 55.30	19 18 19.7	52.67	17	6 46 20.24	21 35 40.1	1.87
18	5 1 3.69	19 23 33.0	51.78	18	6 48 40.13	21 35 47.6	0.65
19	5 3 12.33	19 28 41.0	50.88	19	6 51 0.21	21 35 47.9	0.57
20	5 5 21.23	19 33 43.6	49.98	20	6 53 20.48	21 35 40.8	1.80
21	5 7 30.39	19 38 40.8	49.07	21	6 55 40.94	21 35 26.3	3.03
22	5 9 39.81	19 43 32.5	48.16	22	6 58 1.59	21 35 4.4	4.27
23	5 11 49.49	N.19 48 18.7	47.23	23	7 0 22.42	N.21 34 35.1	5.50
<b>THURSDAY 10.</b>				<b>SATURDAY 12.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	5 13 59.43	N.19 52 59.2	46.28	0	7 2 43.43	N.21 33 58.4	6.75
1	5 16 9.63	19 57 34.1	45.35	1	7 5 4.61	21 33 14.1	8.01
2	5 18 20.09	20 2 3.4	44.41	2	7 7 25.97	21 32 22.3	9.26
3	5 20 30.80	20 6 27.0	43.45	3	7 9 47.50	21 31 23.0	10.52
4	5 22 41.77	20 10 44.8	42.48	4	7 12 9.19	21 30 16.1	11.78
5	5 24 53.00	20 14 56.8	41.52	5	7 14 31.05	21 29 1.7	13.04
6	5 27 4.49	20 19 3.0	40.54	6	7 16 53.07	21 27 39.6	14.32
7	5 29 16.24	20 23 3.3	39.56	7	7 19 15.24	21 26 9.9	15.59
8	5 31 28.24	20 26 57.7	38.57	8	7 21 37.56	21 24 32.5	16.87
9	5 33 40.50	20 30 46.1	37.56	9	7 24 0.04	21 22 47.5	18.14
10	5 35 53.01	20 34 28.4	36.55	10	7 26 22.66	21 20 54.8	19.43
11	5 38 5.77	20 38 4.7	35.53	11	7 28 45.42	21 18 54.3	20.72
12	5 40 18.79	20 41 34.8	34.51	12	7 31 8.33	21 16 46.2	22.00
13	5 42 32.06	20 44 58.8	33.48	13	7 33 31.37	21 14 30.3	23.30
14	5 44 45.58	20 48 16.6	32.44	14	7 35 54.55	21 12 6.6	24.59
15	5 46 59.35	20 51 28.1	31.40	15	7 38 17.85	21 9 35.2	25.88
16	5 49 13.37	20 54 33.4	30.35	16	7 40 41.27	21 6 56.0	27.18
17	5 51 27.64	20 57 32.3	29.28	17	7 43 4.82	21 4 9.0	28.49
18	5 53 42.16	21 0 24.8	28.22	18	7 45 28.49	21 1 14.1	29.79
19	5 55 56.92	21 3 11.0	27.16	19	7 47 52.27	20 58 11.5	31.09
20	5 58 11.92	21 5 50.7	26.08	20	7 50 16.16	20 55 1.0	32.40
21	6 0 27.17	21 8 23.9	24.98	21	7 52 40.16	20 51 42.7	33.71
22	6 2 42.66	21 10 50.5	23.88	22	7 55 4.26	20 48 16.5	35.02
23	6 4 58.39	21 13 10.5	22.78	23	7 57 28.46	20 44 42.5	36.32
24	6 7 14.36	N.21 15 23.9	21.68	24	7 59 52.75	N.20 41 0.7	37.63



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>SUNDAY 13.</b>				<b>TUESDAY 15.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	7 59 52.75	N.20 41 0.7	37.63	0	9 56 3.38	N.15 13 21.2	97.12
1	8 2 17.14	20 37 11.0	38.94	1	9 58 28.30	15 3 35.2	98.20
2	8 4 41.61	20 33 13.4	40.25	2	10 0 53.17	14 53 42.8	99.27
3	8 7 6.17	20 29 8.0	41.56	3	10 3 17.98	14 43 43.9	100.34
4	8 9 30.81	20 24 54.7	42.87	4	10 5 42.74	14 33 38.7	101.39
5	8 11 55.53	20 20 33.6	44.18	5	10 8 7.44	14 23 27.2	102.43
6	8 14 20.32	20 16 4.6	45.49	6	10 10 32.09	14 13 9.5	103.46
7	8 16 45.18	20 11 27.7	46.80	7	10 12 56.68	14 2 45.7	104.48
8	8 19 10.11	20 6 43.0	48.10	8	10 15 21.20	13 52 15.8	105.49
9	8 21 35.10	20 1 50.5	49.40	9	10 17 45.67	13 41 39.8	106.49
10	8 24 0.15	19 56 50.2	50.71	10	10 20 10.08	13 30 57.9	107.47
11	8 26 25.26	19 51 42.0	52.02	11	10 22 34.42	13 20 10.1	108.44
12	8 28 50.41	19 46 26.0	53.32	12	10 24 58.70	13 9 16.6	109.40
13	8 31 15.62	19 41 2.2	54.61	13	10 27 22.92	12 58 17.3	110.36
14	8 33 40.87	19 35 30.7	55.90	14	10 29 47.07	12 47 12.3	111.29
15	8 36 6.16	19 29 51.4	57.20	15	10 32 11.15	12 36 1.8	112.22
16	8 38 31.49	19 24 4.3	58.49	16	10 34 35.17	12 24 45.7	113.13
17	8 40 56.85	19 18 9.5	59.78	17	10 36 59.12	12 13 24.2	114.03
18	8 43 22.24	19 12 6.9	61.07	18	10 39 23.00	12 1 57.3	114.92
19	8 45 47.66	19 5 56.7	62.34	19	10 41 46.81	11 50 25.1	115.79
20	8 48 13.11	18 59 38.8	63.62	20	10 44 10.56	11 38 47.8	116.65
21	8 50 38.57	18 53 13.2	64.90	21	10 46 34.24	11 27 5.3	117.51
22	8 53 4.06	18 46 40.0	66.17	22	10 48 57.85	11 15 17.7	118.34
23	8 55 29.56	N.18 39 59.1	67.44	23	10 51 21.39	N.11 3 25.2	119.16
<b>MONDAY 14.</b>				<b>WEDNESDAY 16.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	8 57 55.07	N.18 33 10.7	68.70	0	10 53 44.86	N.10 51 27.8	119.97
1	9 0 20.59	18 26 14.7	69.97	1	10 56 8.26	10 39 25.6	120.76
2	9 2 46.11	18 19 11.1	71.23	2	10 58 31.60	10 27 18.7	121.53
3	9 5 11.64	18 12 0.0	72.47	3	11 0 54.87	10 15 7.2	122.29
4	9 7 37.16	18 4 41.5	73.70	4	11 3 18.06	10 2 51.2	123.04
5	9 10 2.68	17 57 15.6	74.94	5	11 5 41.19	9 50 30.7	123.78
6	9 12 28.20	17 49 42.2	76.18	6	11 8 4.26	9 38 5.8	124.50
7	9 14 53.70	17 42 1.4	77.41	7	11 10 27.25	9 25 36.7	125.20
8	9 17 19.19	17 34 13.3	78.62	8	11 12 50.17	9 13 3.4	125.90
9	9 19 44.67	17 26 18.0	79.83	9	11 15 13.03	9 0 25.9	126.58
10	9 22 10.13	17 18 15.3	81.04	10	11 17 35.82	8 47 44.5	127.23
11	9 24 35.57	17 10 5.5	82.23	11	11 19 58.55	8 34 59.2	127.87
12	9 27 0.99	17 1 48.5	83.43	12	11 22 21.21	8 22 10.1	128.49
13	9 29 26.38	16 53 24.3	84.62	13	11 24 43.81	8 9 17.3	129.11
14	9 31 51.75	16 44 53.1	85.79	14	11 27 6.35	7 56 20.8	129.71
15	9 34 17.08	16 36 14.8	86.97	15	11 29 28.82	7 43 20.8	130.29
16	9 36 42.38	16 27 29.5	88.13	16	11 31 51.23	7 30 17.3	130.86
17	9 39 7.65	16 18 37.3	89.28	17	11 34 13.59	7 17 10.5	131.41
18	9 41 32.88	16 9 38.1	90.43	18	11 36 35.88	7 4 0.4	131.94
19	9 43 58.07	16 0 32.1	91.57	19	11 38 58.11	6 50 47.2	132.46
20	9 46 23.22	15 51 19.3	92.70	20	11 41 20.29	6 37 30.9	132.96
21	9 48 48.33	15 41 59.7	93.82	21	11 43 42.41	6 24 11.7	133.44
22	9 51 13.39	15 32 33.5	94.92	22	11 46 4.48	6 10 49.6	133.91
23	9 53 38.41	15 23 0.7	96.02	23	11 48 26.49	5 57 24.8	134.35
24	9 56 3.38	N.15 13 21.2	97.12	24	11 50 48.45	N. 5 43 57.4	134.78



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 17.</b>				<b>SATURDAY 19.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
1	11 50 48.45	N. 5 43 57.4	134.78	1	13 43 53.44	S. 5 20 23.7	135.37
2	11 53 10.36	5 30 27.4	135.21	2	13 46 14.94	5 33 54.7	134.95
3	11 55 32.22	5 16 54.9	135.61	3	13 48 36.48	5 47 23.1	134.52
4	11 57 54.04	5 3 20.1	135.99	4	13 50 58.05	6 0 49.0	134.09
5	12 0 15.80	4 49 43.0	136.37	5	13 53 19.67	6 14 12.2	133.63
6	12 2 37.52	4 36 3.7	136.72	6	13 55 41.33	6 27 32.6	133.16
7	12 4 59.20	4 22 22.4	137.04	7	13 58 3.03	6 40 50.1	132.67
8	12 7 20.83	4 8 39.2	137.36	8	14 0 24.77	6 54 4.6	132.17
9	12 9 42.42	3 54 54.1	137.67	9	14 2 46.56	7 7 16.1	131.65
10	12 12 3.98	3 41 7.2	137.95	10	14 5 8.40	7 20 24.4	131.11
11	12 14 25.50	3 27 18.7	138.21	11	14 7 30.28	7 33 29.4	130.56
12	12 16 46.98	3 13 28.7	138.45	12	14 9 52.22	7 46 31.1	130.00
13	12 19 8.42	2 59 37.3	138.68	13	14 12 14.21	7 59 29.4	129.42
14	12 21 29.83	2 45 44.6	138.89	14	14 14 36.25	8 12 24.1	128.82
15	12 23 51.22	2 31 50.6	139.09	15	14 16 58.34	8 25 15.2	128.21
16	12 26 12.57	2 17 55.5	139.27	16	14 19 20.49	8 38 2.6	127.58
17	12 28 33.90	2 3 59.4	139.43	17	14 21 42.70	8 50 46.1	126.93
18	12 30 55.20	1 50 2.4	139.57	18	14 24 4.96	9 3 25.8	126.28
19	12 33 16.48	1 36 4.6	139.70	19	14 26 27.29	9 16 1.5	125.61
20	12 35 37.73	1 22 6.0	139.81	20	14 28 49.67	9 28 33.1	124.92
21	12 37 58.97	1 8 6.9	139.89	21	14 31 12.11	9 41 0.5	124.22
22	12 40 20.19	0 54 7.4	139.96	22	14 33 34.61	9 53 23.7	123.51
23	12 42 41.39	0 40 7.4	140.02	23	14 35 57.18	10 5 42.6	122.78
24	12 45 2.58	N. 0 26 7.2	140.05	24	14 38 19.82	S. 10 17 57.0	122.03
<b>FRIDAY 18.</b>				<b>SUNDAY 20.</b>			
0	12 47 23.76	N. 0 12 6.8	140.07	0	14 40 42.51	S. 10 30 6.9	121.27
1	12 49 44.93	S. 0 1 53.7	140.07	1	14 43 5.27	10 42 12.2	120.50
2	12 52 6.09	0 15 54.1	140.06	2	14 45 28.10	10 54 12.9	119.72
3	12 54 27.24	0 29 54.4	140.03	3	14 47 50.99	11 6 8.9	118.93
4	12 56 48.39	0 43 54.5	139.98	4	14 50 13.94	11 18 0.0	118.11
5	12 59 9.54	0 57 54.2	139.91	5	14 52 36.97	11 29 46.2	117.28
6	13 1 30.69	1 11 53.4	139.82	6	14 55 0.06	11 41 27.4	116.44
7	13 3 51.84	1 25 52.1	139.72	7	14 57 23.22	11 53 3.5	115.60
8	13 6 12.99	1 39 50.1	139.61	8	14 59 46.45	12 4 34.6	114.74
9	13 8 34.15	1 53 47.4	139.48	9	15 2 9.75	12 16 0.4	113.86
10	13 10 55.31	2 7 43.8	139.32	10	15 4 33.12	12 27 20.9	112.97
11	13 13 16.48	2 21 39.2	139.14	11	15 6 56.55	12 38 36.0	112.07
12	13 15 37.67	2 35 33.5	138.95	12	15 9 20.06	12 49 45.7	111.16
13	13 17 58.87	2 49 26.6	138.75	13	15 11 43.63	13 0 49.9	110.23
14	13 20 20.08	3 3 18.5	138.53	14	15 14 7.28	13 11 48.5	109.30
15	13 22 41.31	3 17 8.9	138.28	15	15 16 30.99	13 22 41.5	108.35
16	13 25 2.56	3 30 57.9	138.02	16	15 18 54.76	13 33 28.7	107.39
17	13 27 23.83	3 44 45.2	137.75	17	15 21 18.61	13 44 10.2	106.42
18	13 29 45.12	3 58 30.9	137.47	18	15 23 42.53	13 54 45.8	105.44
19	13 32 6.44	4 12 14.8	137.16	19	15 26 6.51	14 5 15.5	104.45
20	13 34 27.78	4 25 56.8	136.83	20	15 28 30.56	14 15 39.2	103.43
21	13 36 49.15	4 39 36.8	136.48	21	15 30 54.67	14 25 56.8	102.44
22	13 39 10.55	4 53 14.6	136.12	22	15 33 18.85	14 36 8.3	101.41
23	13 41 31.98	5 6 50.3	135.76	23	15 35 43.10	14 46 13.7	100.37
24	13 43 53.44	S. 5 20 23.7	135.37	24	15 38 7.41	S. 14 56 12.8	99.32



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 21.</b>				<b>WEDNESDAY 23.</b>			
0	h m s	° ' "		0	h m s	° ' "	
1	15 38 7.41	S. 14 56 12.8	99.32	1	17 34 18.66	S. 20 37 41.0	40.84
2	15 40 31.79	15 6 5.6	98.27	2	17 36 43.85	20 41 42.1	39.53
3	15 42 56.22	15 15 52.0	97.20	3	17 39 8.98	20 45 35.3	38.22
4	15 45 20.72	15 25 32.0	96.12	4	17 41 34.06	20 49 20.7	36.90
5	15 47 45.29	15 35 5.5	95.04	5	17 43 59.07	20 52 58.1	35.58
6	15 50 9.91	15 44 32.5	93.95	6	17 46 24.03	20 56 27.7	34.27
7	15 52 34.59	15 53 52.9	92.85	7	17 48 48.92	20 59 49.3	32.95
8	15 54 59.32	16 3 6.7	91.74	8	17 51 13.74	21 3 3.1	31.64
9	15 57 24.11	16 12 13.8	90.62	9	17 53 38.48	21 6 9.0	30.32
10	15 59 48.96	16 21 14.1	89.48	10	17 56 3.15	21 9 7.0	29.01
11	16 2 13.86	16 30 7.6	88.35	11	17 58 27.73	21 11 57.1	27.69
12	16 4 38.81	16 38 54.3	87.21	12	18 0 52.23	21 14 39.3	26.38
13	16 7 3.81	16 47 34.1	86.06	13	18 3 16.65	21 17 13.6	25.07
14	16 9 28.86	16 56 7.0	84.89	14	18 5 40.97	21 19 40.1	23.76
15	16 11 53.96	17 4 32.8	83.73	15	18 8 5.20	21 21 58.7	22.45
16	16 14 19.10	17 12 51.7	82.56	16	18 10 29.33	21 24 9.5	21.14
17	16 16 44.28	17 21 3.5	81.37	17	18 12 53.36	21 26 12.4	19.83
18	16 19 9.51	17 29 8.1	80.18	18	18 15 17.28	21 28 7.5	18.52
19	16 21 34.77	17 37 5.6	78.98	19	18 17 41.09	21 29 54.7	17.22
20	16 24 0.07	17 44 55.9	77.78	20	18 20 4.79	21 31 34.2	15.93
21	16 26 25.40	17 52 39.0	76.57	21	18 22 28.37	21 33 5.9	14.63
22	16 28 50.77	18 0 14.8	75.36	22	18 24 51.83	21 34 29.7	13.33
23	16 31 16.17	18 7 43.3	74.13	23	18 27 15.17	21 35 45.8	12.04
24	16 33 41.60	S. 18 15 4.4	72.90	24	18 29 38.38	S. 21 36 54.2	10.75
<b>TUESDAY 22.</b>				<b>THURSDAY 24.</b>			
0	16 36 7.05	S. 18 22 18.1	71.67	0	18 32 1.45	S. 21 37 54.8	9.46
1	16 38 32.53	18 29 24.4	70.43	1	18 34 24.39	21 38 47.7	8.18
2	16 40 58.02	18 36 23.3	69.18	2	18 36 47.20	21 39 32.9	6.90
3	16 43 23.54	18 43 14.6	67.93	3	18 39 9.87	21 40 10.5	5.62
4	16 45 49.07	18 49 58.5	66.68	4	18 41 32.39	21 40 40.4	4.34
5	16 48 14.62	18 56 34.8	65.42	5	18 43 54.76	21 41 2.6	3.07
6	16 50 40.17	19 3 3.5	64.15	6	18 46 16.98	21 41 17.3	1.81
7	16 53 5.74	19 9 24.6	62.88	7	18 48 39.05	21 41 24.3	0.54
8	16 55 31.31	19 15 38.1	61.62	8	18 51 0.96	21 41 23.8	0.71
9	16 57 56.88	19 21 44.0	60.34	9	18 53 22.71	21 41 15.8	1.96
10	17 0 22.45	19 27 42.2	59.06	10	18 55 44.30	21 41 0.3	3.21
11	17 2 48.02	19 33 32.7	57.77	11	18 58 5.72	21 40 37.3	4.46
12	17 5 13.58	19 39 15.5	56.48	12	19 0 26.97	21 40 6.8	5.70
13	17 7 39.13	19 44 50.5	55.19	13	19 2 48.05	21 39 28.9	6.93
14	17 10 4.67	19 50 17.8	53.90	14	19 5 8.95	21 38 43.6	8.16
15	17 12 30.19	19 55 37.3	52.60	15	19 7 29.67	21 37 51.0	9.38
16	17 14 55.70	20 0 49.0	51.31	16	19 9 50.21	21 36 51.0	10.61
17	17 17 21.18	20 5 53.0	50.01	17	19 12 10.56	21 35 43.7	11.82
18	17 19 46.64	20 10 49.1	48.69	18	19 14 30.73	21 34 29.1	13.03
19	17 22 12.06	20 15 37.3	47.39	19	19 16 50.71	21 33 7.3	14.23
20	17 24 37.46	20 20 17.8	46.09	20	19 19 10.49	21 31 38.3	15.43
21	17 27 2.82	20 24 50.4	44.78	21	19 21 30.07	21 30 2.1	16.63
22	17 29 28.14	20 29 15.1	43.47	22	19 23 49.46	21 28 18.8	17.82
23	17 31 53.42	20 33 32.0	42.16	23	19 26 8.64	21 26 28.3	19.00
24	17 34 18.66	S. 20 37 41.0	40.84	24	19 28 27.62	S. 21 24 30.8	20.17



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>FRIDAY 25.</b>				<b>SUNDAY 27.</b>			
0	h m s 19 28 27.62	S. 21 24 30.8	20.17	0	h m s 21 15 4.29	S. 17 45 32.2	68.14
1	19 30 46.39	21 22 26.3	21.34	1	21 17 11.45	17 38 40.9	68.95
2	19 33 4.96	21 20 14.7	22.51	2	21 19 18.35	17 31 44.8	69.74
3	19 35 23.31	21 17 56.2	23.66	3	21 21 25.00	17 24 44.0	70.53
4	19 37 41.45	21 15 30.8	24.81	4	21 23 31.40	17 17 38.5	71.31
5	19 39 59.38	21 12 58.5	25.96	5	21 25 37.55	17 10 28.3	72.08
6	19 42 17.08	21 10 19.3	27.09	6	21 27 43.45	17 3 13.5	72.85
7	19 44 34.57	21 7 33.4	28.22	7	21 29 49.11	16 55 54.1	73.61
8	19 46 51.83	21 4 40.7	29.35	8	21 31 54.51	16 48 30.2	74.35
9	19 49 8.87	21 1 41.2	30.47	9	21 33 59.67	16 41 1.9	75.09
10	19 51 25.69	20 58 35.1	31.58	10	21 36 4.58	16 33 29.1	75.82
11	19 53 42.27	20 55 22.3	32.67	11	21 38 9.24	16 25 52.0	76.54
12	19 55 58.63	20 52 3.0	33.77	12	21 40 13.66	16 18 10.6	77.26
13	19 58 14.75	20 48 37.1	34.86	13	21 42 17.84	16 10 24.9	77.97
14	20 0 30.64	20 45 4.7	35.94	14	21 44 21.78	16 2 35.0	78.67
15	20 2 46.30	20 41 25.8	37.02	15	21 46 25.47	15 54 40.9	79.36
16	20 5 1.72	20 37 40.4	38.09	16	21 48 28.93	15 46 42.7	80.03
17	20 7 16.90	20 33 48.7	39.14	17	21 50 32.15	15 38 40.5	80.71
18	20 9 31.85	20 29 50.7	40.19	18	21 52 35.13	15 30 34.2	81.38
19	20 11 46.55	20 25 46.4	41.24	19	21 54 37.87	15 22 24.0	82.03
20	20 14 1.01	20 21 35.8	42.28	20	21 56 40.38	15 14 9.8	82.68
21	20 16 15.22	20 17 19.0	43.32	21	21 58 42.66	15 5 51.8	83.32
22	20 18 29.19	20 12 56.0	44.33	22	22 0 44.71	14 57 29.9	83.96
23	20 20 42.92	S. 20 8 27.0	45.34	23	22 2 46.52	S. 14 49 4.3	84.58
<b>SATURDAY 26.</b>				<b>MONDAY 28.</b>			
0	20 22 56.40	S. 20 3 51.9	46.35	0	22 4 48.11	S. 14 40 35.0	85.19
1	20 25 9.63	19 59 10.8	47.36	1	22 6 49.47	14 32 2.0	85.80
2	20 27 22.62	19 54 23.6	48.36	2	22 8 50.60	14 23 25.4	86.40
3	20 29 35.35	19 49 30.5	49.33	3	22 10 51.51	14 14 45.2	87.00
4	20 31 47.83	19 44 31.6	50.30	4	22 12 52.20	14 6 1.4	87.58
5	20 34 0.07	19 39 26.9	51.27	5	22 14 52.67	13 57 14.2	88.16
6	20 36 12.05	19 34 16.3	52.24	6	22 16 52.92	13 48 23.5	88.73
7	20 38 23.78	19 29 0.0	53.19	7	22 18 52.95	13 39 29.5	89.28
8	20 40 35.25	19 23 38.0	54.13	8	22 20 52.77	13 30 32.1	89.83
9	20 42 46.47	19 18 10.4	55.07	9	22 22 52.37	13 21 31.5	90.38
10	20 44 57.44	19 12 37.2	56.00	10	22 24 51.76	13 12 27.6	90.92
11	20 47 8.16	19 6 58.4	56.92	11	22 26 50.94	13 3 20.5	91.44
12	20 49 18.62	19 1 14.2	57.83	12	22 28 49.91	12 54 10.3	91.96
13	20 51 28.83	18 55 24.5	58.73	13	22 30 48.68	12 44 57.0	92.47
14	20 53 38.78	18 49 29.4	59.63	14	22 32 47.24	12 35 40.6	92.98
15	20 55 48.47	18 43 29.0	60.52	15	22 34 45.60	12 26 21.2	93.48
16	20 57 57.91	18 37 23.2	61.40	16	22 36 43.76	12 16 58.9	93.97
17	21 0 7.10	18 31 12.2	62.27	17	22 38 41.72	12 7 33.6	94.45
18	21 2 16.04	18 24 56.0	63.13	18	22 40 39.49	11 58 5.5	94.92
19	21 4 24.72	18 18 34.6	63.99	19	22 42 37.06	11 48 34.6	95.38
20	21 6 33.14	18 12 8.1	64.83	20	22 44 34.44	11 39 0.9	95.85
21	21 8 41.31	18 5 36.6	65.67	21	22 46 31.63	11 29 24.4	96.30
22	21 10 49.22	17 59 0.1	66.50	22	22 48 28.64	11 19 45.3	96.74
23	21 12 56.88	17 52 18.6	67.32	23	22 50 25.46	11 10 3.5	97.17
24	21 15 4.29	S. 17 45 32.2	68.14	24	22 52 22.09	S. 11 0 19.2	97.59



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>TUESDAY 29.</b>				<b>THURSDAY 31.</b>			
0	22 52 22.09	S. 11 0 19.2	97.59	0	0 22 52.61	S. 2 36 40.7	109.50
1	22 54 18.55	10 50 32.4	98.02	1	0 24 43.29	2 25 43.5	109.58
2	22 56 14.83	10 40 43.0	98.43	2	0 26 33.91	2 14 45.8	109.65
3	22 58 10.93	10 30 51.2	98.83	3	0 28 24.48	2 3 47.7	109.71
4	23 0 6.85	10 20 57.0	99.23	4	0 30 14.99	1 52 49.3	109.77
5	23 2 2.61	10 11 0.4	99.62	5	0 32 5.46	1 41 50.5	109.82
6	23 3 58.19	10 1 1.5	100.01	6	0 33 55.88	1 30 51.5	109.86
7	23 5 53.61	9 51 0.3	100.38	7	0 35 46.27	1 19 52.2	109.90
8	23 7 48.87	9 40 56.9	100.74	8	0 37 36.61	1 8 52.7	109.93
9	23 9 43.96	9 30 51.4	101.10	9	0 39 26.91	0 57 53.1	109.94
10	23 11 38.89	9 20 43.7	101.46	10	0 41 17.18	0 46 53.4	109.96
11	23 13 33.66	9 10 33.9	101.80	11	0 43 7.42	0 35 53.6	109.97
12	23 15 28.28	9 0 22.1	102.13	12	0 44 57.63	0 24 53.7	109.98
13	23 17 22.75	8 50 8.3	102.47	13	0 46 47.81	0 13 53.8	109.97
14	23 19 17.06	8 39 52.5	102.79	14	0 48 37.97	S. 0 2 54.0	109.96
15	23 21 11.23	8 29 34.8	103.10	15	0 50 28.11	N. 0 8 5.7	109.94
16	23 23 5.25	8 19 15.3	103.41	16	0 52 18.22	0 19 5.3	109.92
17	23 24 59.13	8 8 53.9	103.71	17	0 54 8.32	0 30 4.7	109.89
18	23 26 52.87	7 58 30.8	104.00	18	0 55 58.41	0 41 4.0	109.86
19	23 28 46.48	7 48 5.9	104.29	19	0 57 48.49	0 52 3.0	109.81
20	23 30 39.95	7 37 39.3	104.57	20	0 59 38.56	1 3 1.7	109.76
21	23 32 33.28	7 27 11.1	104.83	21	1 1 28.63	1 14 0.1	109.71
22	23 34 26.48	7 16 41.3	105.10	22	1 3 18.69	1 24 58.2	109.64
23	23 36 19.56	S. 7 6 9.9	105.36	23	1 5 8.76	N. 1 35 55.8	109.57
<b>WEDNESDAY 30.</b>				<b>FRIDAY, APRIL 1.</b>			
0	23 38 12.51	S. 6 55 37.0	105.61	0	1 6 58.83	N. 1 46 53.0	109.49
1	23 40 5.34	6 45 2.6	105.85				
2	23 41 58.05	6 34 26.8	106.08				
3	23 43 50.64	6 23 49.6	106.32				
4	23 45 43.12	6 13 11.0	106.54				
5	23 47 35.49	6 2 31.1	106.75				
6	23 49 27.74	5 51 50.0	106.96				
7	23 51 19.89	5 41 7.6	107.16				
8	23 53 11.94	5 30 24.1	107.35				
9	23 55 3.88	5 19 39.4	107.54				
10	23 56 55.72	5 8 53.6	107.72				
11	23 58 47.47	4 58 6.7	107.89				
12	0 0 39.12	4 47 18.9	108.05				
13	0 2 30.68	4 36 30.1	108.22				
14	0 4 22.16	4 25 40.3	108.37				
15	0 6 13.55	4 14 49.7	108.51				
16	0 8 4.85	4 3 58.2	108.65				
17	0 9 56.07	3 53 5.9	108.78				
18	0 11 47.22	3 42 12.8	108.91				
19	0 13 38.29	3 31 19.0	109.02				
20	0 15 29.29	3 20 24.6	109.13				
21	0 17 20.22	3 9 29.5	109.23				
22	0 19 11.08	2 58 33.8	109.33				
23	0 21 1.88	2 47 37.5	109.42				
24	0 22 52.61	S. 2 36 40.7	109.50				

## PHASES OF THE MOON.

Mar. 1	● New Moon	- 20 39.9
10	☾ First Quarter	- 1 11.6
17	○ Full Moon	- 1 52.1
23	☾ Last Quarter	- 16 37.4
31	● New Moon	- 13 58.1

Mar. 5	☾ Apogee	- - - - h
18	☾ Perigee	- - - - 0



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
4	SUN W.	24 5 26	3476	25 26 17	3477	26 47 7	3477	28 7 57	3478
	Jupiter E.	39 1 45	3135	37 34 18	3141	36 6 58	3148	34 39 46	3153
	Aldebaran E.	60 19 39	3048	58 50 26	3052	57 21 18	3056	55 52 15	3060
	Pollux E.	104 28 32	3082	103 0 1	3086	101 31 34	3090	100 3 12	3093
5	SUN W.	34 51 51	3483	36 12 34	3483	37 33 17	3485	38 53 58	3485
	Aldebaran E.	48 28 6	3076	46 59 27	3078	45 30 51	3080	44 2 17	3082
	Pollux E.	92 42 18	3107	91 14 17	3109	89 46 19	3111	88 18 23	3113
6	SUN W.	45 37 22	3484	46 58 4	3483	48 18 47	3482	49 39 31	3480
	Aldebaran E.	36 39 56	3087	35 11 31	3087	33 43 6	3087	32 14 41	3086
	Pollux E.	80 59 6	3118	79 31 18	3117	78 3 29	3117	76 35 40	3117
	Regulus E.	116 48 44	3087	115 20 18	3086	113 51 51	3085	112 23 23	3084
7	SUN W.	56 23 49	3466	57 44 51	3462	59 5 57	3458	60 27 8	3454
	Pollux E.	69 16 18	3109	67 48 19	3106	66 20 17	3104	64 52 12	3100
	Regulus E.	105 0 34	3073	103 31 52	3069	102 3 5	3066	100 34 14	3061
8	SUN W.	67 14 33	3423	68 36 23	3415	69 58 22	3407	71 20 31	3399
	$\alpha$ Arietis W.	23 53 31	4110	25 3 23	3990	26 15 13	3885	27 28 48	3793
	Pollux E.	57 30 40	3080	56 2 6	3075	54 33 26	3070	53 4 40	3064
	Regulus E.	93 8 30	3035	91 39 1	3028	90 9 23	3021	88 39 36	3013
9	SUN W.	78 13 46	3350	79 36 59	3339	81 0 26	3327	82 24 6	3315
	$\alpha$ Arietis W.	33 57 13	3472	35 18 8	3425	36 39 56	3382	38 2 33	3343
	Jupiter W.	20 3 39	3114	21 31 31	3093	22 59 49	3074	24 28 31	3055
	Pollux E.	45 39 0	3034	44 9 30	3027	42 39 51	3021	41 10 4	3015
	Regulus E.	81 8 9	2969	79 37 17	2958	78 6 12	2948	76 34 54	2937
10	SUN W.	89 26 9	3248	90 51 22	3233	92 16 52	3218	93 42 40	3202
	$\alpha$ Arietis W.	45 6 16	3176	46 32 54	3146	48 0 8	3119	49 27 54	3092
	Jupiter W.	31 57 26	2970	33 28 16	2954	34 59 27	2937	36 30 59	2920
	Pollux E.	33 39 19	2988	32 8 52	2985	30 38 20	2984	29 7 47	2983
	Regulus E.	68 54 42	2875	67 21 51	2862	65 48 43	2847	64 15 16	2834
	Spica E.	122 38 35	2919	121 6 40	2903	119 34 25	2888	118 1 51	2873
11	SUN W.	100 56 30	3118	102 24 18	3100	103 52 27	3082	105 20 58	3064
	$\alpha$ Arietis W.	56 54 48	2966	58 25 43	2942	59 57 8	2919	61 29 3	2896
	Jupiter W.	44 14 2	2834	45 47 46	2817	47 21 52	2798	48 56 22	2780
	Aldebaran W.	23 53 20	2762	25 28 38	2744	27 4 20	2726	28 40 25	2708
	Regulus E.	56 23 17	2756	54 47 52	2740	53 12 5	2724	51 35 57	2706
	Spica E.	110 13 50	2790	108 39 9	2772	107 4 5	2756	105 28 39	2738
12	SUN W.	112 49 17	2970	114 20 8	2950	115 51 24	2930	117 23 5	2910
	$\alpha$ Arietis W.	69 15 55	2783	70 50 45	2762	72 26 3	2740	74 1 49	2718
	Jupiter W.	56 54 57	2687	58 31 54	2667	60 9 18	2649	61 47 7	2629
	Aldebaran W.	36 46 53	2617	38 25 25	2598	40 4 23	2579	41 43 47	2560
	Regulus E.	43 29 28	2619	41 50 59	2601	40 12 5	2583	38 32 46	2565
	Spica E.	97 25 28	2646	95 47 36	2627	94 9 18	2609	92 30 35	2591
13	SUN W.	125 7 51	2811	126 42 5	2791	128 16 45	2771	129 51 51	2752
	$\alpha$ Arietis W.	82 7 48	2614	83 46 24	2595	85 25 26	2574	87 4 57	2555
	Jupiter W.	70 2 53	2531	71 43 23	2512	73 24 20	2492	75 5 44	2473
	Aldebaran W.	50 7 23	2464	51 49 27	2445	53 31 58	2426	55 14 56	2407



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
4	SUN W.	29 28 46	3479	30 49 34	3480	32 10 21	3481	33 31 6	3481
	Jupiter E.	33 12 41	3160	31 45 44	3167	30 18 55	3173	28 52 13	3180
	Aldebaran E.	54 23 17	3064	52 54 23	3068	51 25 34	3070	49 56 48	3073
	Pollux E.	98 34 54	3096	97 6 40	3099	95 38 29	3102	94 10 22	3105
5	SUN W.	40 14 39	3485	41 35 20	3485	42 56 1	3486	44 16 41	3485
	Aldebaran E.	42 33 46	3084	41 5 17	3085	39 36 49	3086	38 8 22	3087
	Pollux E.	86 50 29	3114	85 22 36	3115	83 54 45	3116	82 26 55	3117
6	SUN W.	51 0 18	3479	52 21 6	3476	53 41 57	3473	55 2 51	3470
	Aldebaran E.	30 46 14	3086	29 17 47	3085	27 49 19	3083	26 20 49	3082
	Pollux E.	75 7 51	3115	73 40 0	3114	72 12 8	3113	70 44 14	3111
	Regulus E.	110 54 54	3082	109 26 23	3080	107 57 49	3078	106 29 13	3076
7	SUN W.	61 48 24	3448	63 9 46	3443	64 31 14	3436	65 52 50	3430
	Pollux E.	63 24 2	3097	61 55 49	3093	60 27 31	3089	58 59 8	3085
	Regulus E.	99 5 17	3057	97 36 15	3052	96 7 7	3047	94 37 52	3041
8	SUN W.	72 42 48	3390	74 5 16	3380	75 27 55	3371	76 50 44	3360
	α Arietis W.	28 43 57	3713	30 0 30	3643	31 18 18	3580	32 37 14	3523
	Pollux E.	51 35 46	3059	50 6 46	3052	48 37 38	3047	47 8 23	3040
	Regulus E.	87 9 39	3005	85 39 33	2997	84 9 16	2988	82 38 48	2979
9	SUN W.	83 48 0	3302	85 12 9	3289	86 36 33	3276	88 1 13	3262
	α Arietis W.	39 25 55	3305	40 50 1	3270	42 14 48	3237	43 40 13	3205
	Jupiter W.	25 57 35	3037	27 27 2	3021	28 56 49	3004	30 26 57	2987
	Pollux E.	39 40 10	3008	38 10 7	3003	36 39 58	2998	35 9 42	2992
	Regulus E.	75 3 22	2925	73 31 35	2913	71 59 33	2901	70 27 16	2888
10	SUN W.	95 8 47	3186	96 35 13	3169	98 1 59	3153	99 29 4	3136
	α Arietis W.	50 56 14	3065	52 25 6	3040	53 54 29	3015	55 24 23	2990
	Jupiter W.	38 2 52	2903	39 35 7	2887	41 7 43	2869	42 40 42	2852
	Pollux E.	27 37 13	2985	26 6 42	2990	24 36 17	2999	23 6 3	3013
	Regulus E.	62 41 32	2819	61 7 28	2804	59 33 5	2788	57 58 21	2772
	Spica E.	116 28 57	2856	114 55 42	2840	113 22 6	2824	111 48 9	2807
11	SUN W.	106 49 51	3046	108 19 7	3026	109 48 47	3008	111 18 50	2989
	α Arietis W.	63 1 27	2873	64 34 21	2851	66 7 43	2828	67 41 35	2808
	Jupiter W.	50 31 16	2762	52 6 34	2743	53 42 17	2725	55 18 24	2705
	Aldebaran W.	30 16 54	2690	31 53 47	2672	33 31 4	2654	35 8 46	2633
	Regulus E.	49 59 25	2689	48 22 31	2672	46 45 14	2655	45 7 33	2637
	Spica E.	103 52 49	2720	102 16 35	2702	100 39 57	2684	99 2 55	2665
12	SUN W.	118 55 11	2890	120 27 43	2870	122 0 40	2850	123 34 3	2831
	α Arietis W.	75 38 5	2698	77 14 48	2676	78 52 0	2655	80 29 40	2635
	Jupiter W.	63 25 23	2609	65 4 6	2590	66 43 15	2571	68 22 50	2551
	Aldebaran W.	43 23 37	2540	45 3 54	2522	46 44 37	2502	48 25 47	2484
	Regulus E.	36 53 3	2546	35 12 54	2528	33 32 20	2510	31 51 20	2492
	Spica E.	90 51 27	2572	89 11 53	2552	87 31 52	2533	85 51 24	2514
13	SUN W.	131 27 22	2732	133 3 19	2713	134 39 41	2695	136 16 27	2677
	α Arietis W.	88 44 53	2535	90 25 17	2517	92 6 6	2499	93 47 21	2481
	Jupiter W.	76 47 35	2454	78 29 53	2434	80 12 39	2416	81 55 51	2397
	Aldebaran W.	56 58 21	2387	58 42 14	2369	60 26 33	2350	62 11 20	2332



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
13	Regulus E.	30 9 56	2474	28 28 7	2457	26 45 53	2439	25 3 14	2423
	Spica E.	84 10 31	2495	82 29 11	2477	80 47 26	2458	79 5 13	2440
14	α Arietis W.	95 29 1	2464	97 11 5	2447	98 53 33	2430	100 36 25	2415
	Jupiter W.	83 39 30	2379	85 23 35	2360	87 8 7	2342	88 53 5	2324
	Aldebaran W.	63 56 33	2313	65 42 13	2295	67 28 20	2278	69 14 52	2260
	Pollux W.	20 51 45	2572	22 31 18	2518	24 12 6	2471	25 54 0	2430
	Spica E.	70 27 40	2350	68 42 53	2333	66 57 41	2316	65 12 4	2300
	Antares E.	116 19 43	2368	114 35 23	2349	112 50 35	2330	111 5 19	2311
15	α Arietis W.	109 15 57	2348	111 0 47	2337	112 45 53	2326	114 31 14	2317
	Jupiter W.	97 44 10	2242	99 31 35	2227	101 19 22	2212	103 7 31	2198
	Aldebaran W.	78 13 54	2178	80 2 55	2163	81 52 18	2148	83 42 4	2134
	Pollux W.	34 36 17	2278	36 22 49	2254	38 9 56	2232	39 57 35	2212
	Spica E.	56 18 18	2226	54 30 29	2213	52 42 21	2201	50 53 54	2190
	Antares E.	102 12 22	2224	100 24 31	2208	98 36 16	2194	96 47 39	2180
	Saturn E.	122 6 49	2188	120 18 4	2173	118 28 56	2158	116 39 26	2144
16	Jupiter W.	112 13 17	2137	114 3 20	2126	115 53 39	2117	117 44 12	2108
	Aldebaran W.	92 56 0	2072	94 47 42	2061	96 39 41	2051	98 31 56	2042
	Pollux W.	49 2 55	2128	50 53 12	2114	52 43 50	2102	54 34 46	2090
	Regulus W.	12 54 56	2125	14 45 17	2103	16 36 11	2084	18 27 34	2069
	Spica E.	41 47 59	2149	39 58 14	2145	38 8 23	2143	36 18 29	2142
	Antares E.	87 39 26	2117	85 48 52	2106	83 58 2	2097	82 6 58	2088
	Saturn E.	107 26 46	2081	105 35 18	2071	103 43 34	2061	101 51 34	2052
17	Aldebaran W.	107 56 19	2007	109 49 43	2002	111 43 14	1998	113 36 52	1995
	Pollux W.	63 53 30	2046	65 45 53	2040	67 38 25	2035	69 31 5	2030
	Regulus W.	27 49 29	2019	29 42 34	2012	31 35 50	2007	33 29 13	2003
	Spica E.	27 9 58	2181	25 21 2	2202	23 32 38	2232	21 44 58	2272
	Antares E.	72 48 38	2056	70 56 31	2052	69 4 18	2050	67 12 2	2048
	Saturn E.	92 28 20	2016	90 35 10	2011	88 41 53	2006	86 48 28	2003
	α Aquilæ E.	116 57 15	2781	115 22 22	2752	113 46 51	2726	112 10 46	2704
18	Pollux W.	78 55 40	2021	80 48 41	2022	82 41 40	2024	84 34 36	2027
	Regulus W.	42 57 27	1994	44 51 11	1995	46 44 53	1996	48 38 33	1999
	Antares E.	57 50 25	2053	55 58 14	2057	54 6 9	2063	52 14 13	2070
	Saturn E.	77 20 31	1997	75 26 52	1999	73 33 16	2001	71 39 43	2003
	α Aquilæ E.	104 3 56	2629	102 25 40	2621	100 47 13	2615	99 8 38	2611
19	Pollux W.	93 57 52	2051	95 50 7	2059	97 42 9	2066	99 34 0	2075
	Regulus W.	58 5 32	2023	59 58 31	2029	61 51 20	2037	63 43 57	2045
	Antares E.	42 57 43	2122	41 7 17	2137	39 17 15	2154	37 27 38	2173
	Saturn E.	62 13 24	2028	60 20 33	2035	58 27 54	2043	56 35 26	2051
	α Aquilæ E.	90 55 19	2621	89 16 53	2629	87 38 37	2638	86 0 34	2649
	Venus E.	120 11 28	2129	118 21 13	2134	116 31 6	2141	114 41 9	2148
20	Pollux W.	108 49 33	2128	110 39 49	2141	112 29 45	2154	114 19 23	2168
	Regulus W.	73 3 33	2094	74 54 41	2106	76 45 31	2118	78 36 3	2130
	Spica E.	20 14 20	2363	21 58 48	2334	23 43 58	2315	25 29 36	2302
	Antares E.	28 28 5	2314	26 42 26	2357	24 57 49	2406	23 14 23	2365
	Saturn E.	47 16 37	2101	45 25 40	2113	43 35 0	2125	41 44 39	2137
	α Aquilæ E.	77 54 49	2731	76 18 51	2753	74 43 21	2777	73 8 23	2802



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
13	Regulus E.	23 20 12	2407	21 36 47	2392	19 53 0	2378	18 8 54	2365
	Spica E.	77 22 35	2421	75 39 30	2403	73 55 59	2385	72 12 2	2367
14	α Arietis W.	102 19 38	2400	104 3 13	2386	105 47 8	2372	107 31 23	2359
	Jupiter W.	90 38 29	2308	92 24 17	2290	94 10 31	2274	95 57 9	2258
	Aldebaran W.	71 1 51	2243	72 49 14	2226	74 37 3	2209	76 25 17	2194
	Pollux W.	27 36 52	2394	29 20 36	2361	31 5 7	2331	32 50 22	2303
	Spica E.	63 26 4	2284	61 39 41	2268	59 52 55	2253	58 5 47	2239
	Antares E.	109 19 36	2293	107 33 26	2275	105 46 50	2258	103 59 48	2241
15	α Arietis W.	116 16 48	2310	118 2 33	2304	119 48 27	2299	121 34 28	2295
	Jupiter W.	104 56 1	2184	106 44 52	2172	108 34 2	2159	110 23 31	2148
	Aldebaran W.	85 32 11	2120	87 22 39	2107	89 13 27	2095	91 4 34	2083
	Pollux W.	41 45 45	2192	43 34 24	2174	45 23 30	2158	47 13 0	2142
	Spica E.	49 5 11	2180	47 16 13	2170	45 27 0	2162	43 37 35	2155
	Antares E.	94 58 41	2165	93 9 21	2152	91 19 41	2140	89 29 42	2128
	Saturn E.	114 49 34	2130	112 59 21	2117	111 8 48	2105	109 17 56	2093
16	Jupiter W.	119 34 59	2100	121 25 59	2093	123 17 9	2086	125 8 30	2080
	Aldebaran W.	100 24 24	2034	102 17 6	2026	104 10 0	2019	106 3 5	2013
	Pollux W.	56 26 1	2079	58 17 32	2070	60 9 18	2061	62 1 18	2053
	Regulus W.	20 19 22	2056	22 11 29	2044	24 3 54	2034	25 56 35	2026
	Spica E.	34 28 33	2143	32 38 40	2147	30 48 53	2155	28 59 17	2166
	Antares E.	80 15 40	2080	78 24 10	2073	76 32 29	2066	74 40 38	2060
	Saturn E.	99 59 20	2043	98 6 52	2035	96 14 13	2027	94 21 21	2021
17	Aldebaran W.	115 30 34	1992	117 24 21	1991	119 18 10	1990	121 12 1	1989
	Pollux W.	71 23 53	2027	73 16 45	2025	75 9 41	2023	77 2 40	2022
	Regulus W.	35 22 44	1999	37 16 20	1996	39 10 0	1995	41 3 43	1994
	Spica E.	19 58 17	2325	18 12 53	2398	16 29 15	2500	14 48 2	2647
	Antares E.	65 19 42	2047	63 27 21	2047	61 35 0	2048	59 42 41	2050
	Saturn E.	84 54 58	2001	83 1 25	1999	81 7 48	1998	79 14 10	1997
	α Aquilæ E.	110 34 11	2684	108 57 9	2666	107 19 43	2651	105 41 58	2639
18	Pollux W.	86 27 28	2030	88 20 15	2034	90 12 56	2040	92 5 28	2045
	Regulus W.	50 32 9	2002	52 25 40	2006	54 19 5	2010	56 12 23	2016
	Antares E.	50 22 27	2077	48 30 53	2086	46 39 33	2097	44 48 29	2109
	Saturn E.	69 46 14	2007	67 52 50	2012	65 59 34	2016	64 6 24	2022
	α Aquilæ E.	97 29 58	2609	95 51 15	2610	94 12 33	2612	92 33 54	2615
19	Pollux W.	101 25 37	2084	103 17 0	2094	105 8 8	2105	106 58 59	2116
	Regulus W.	65 36 21	2053	67 28 32	2063	69 20 28	2073	71 12 9	2084
	Antares E.	35 38 30	2195	33 49 55	2219	32 1 55	2247	30 14 37	2278
	Saturn E.	54 43 11	2060	52 51 10	2069	50 59 23	2079	49 7 52	2090
	α Aquilæ E.	84 22 45	2662	82 45 14	2677	81 8 3	2693	79 31 14	2711
	Venus E.	112 51 23	2156	111 1 49	2165	109 12 29	2175	107 23 23	2185
20	Pollux W.	116 8 39	2182	117 57 34	2196	119 46 7	2212	121 34 17	2227
	Regulus W.	80 26 16	2143	82 16 9	2157	84 5 42	2170	85 54 55	2184
	Spica W.	27 15 33	2295	29 1 40	2291	30 47 53	2291	32 34 6	2293
	Antares E.	21 32 21	2538	19 52 1	2629	18 13 46	2745	16 38 6	2896
	Saturn E.	39 54 36	2151	38 4 54	2164	36 15 32	2178	34 26 31	2192
	α Aquilæ E.	71 33 58	2830	70 0 9	2859	68 26 58	2891	66 54 28	2926



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
20	Venus E.	105 34 33	2196	103 46 0	2208	101 57 45	2220	100 9 48	2233
	Fomalhaut E.	111 17 52	2344	109 32 56	2350	107 48 9	2357	106 3 32	2364
	SUN E.	138 23 26	2421	136 40 22	2431	134 57 32	2443	133 14 59	2455
21	Regulus W.	87 43 46	2198	89 32 16	2213	91 20 24	2228	93 8 10	2243
	Spica W.	34 20 16	2297	36 6 20	2303	37 52 15	2311	39 37 58	2320
	Saturn E.	32 37 51	2206	30 49 33	2221	29 1 37	2237	27 14 4	2252
	$\alpha$ Aquilæ E.	65 22 42	2962	63 51 41	3001	62 21 29	3043	60 52 9	3087
	Venus E.	91 15 6	2306	89 29 15	2321	87 43 46	2337	85 58 41	2354
	Fomalhaut E.	97 23 46	2419	95 40 38	2431	93 57 48	2445	92 15 18	2460
	SUN E.	124 46 44	2523	123 6 3	2539	121 25 44	2554	119 45 46	2569
22	Regulus W.	102 1 19	2322	103 46 47	2337	105 31 52	2354	107 16 33	2370
	Spica W.	48 22 55	2376	50 7 4	2390	51 50 53	2403	53 34 23	2417
	$\alpha$ Aquilæ E.	53 40 11	3360	52 17 8	3427	50 55 22	3499	49 34 57	3577
	Venus E.	77 19 22	2440	75 36 44	2458	73 54 32	2477	72 12 46	2494
	Fomalhaut E.	83 48 12	2544	82 7 57	2560	80 28 7	2578	78 48 41	2597
	SUN E.	111 31 24	2652	109 53 39	2669	108 16 18	2686	106 39 19	2702
23	Spica W.	62 6 53	2489	63 48 22	2504	65 29 30	2519	67 10 17	2533
	Antares W.	17 35 6	2962	19 6 6	2897	20 38 29	2850	22 11 52	2816
	Venus E.	63 50 17	2587	62 11 4	2606	60 32 17	2625	58 53 56	2644
	Fomalhaut E.	70 38 13	2698	69 1 30	2720	67 25 17	2742	65 49 33	2766
	SUN E.	98 40 7	2789	97 5 24	2807	95 31 5	2823	93 57 7	2841
24	Spica W.	75 29 7	2607	77 7 53	2621	78 46 19	2635	80 24 26	2649
	Antares W.	30 6 28	2751	31 42 1	2750	33 17 35	2750	34 53 8	2753
	Venus E.	50 48 33	2739	49 12 45	2759	47 37 23	2778	46 2 26	2798
	Fomalhaut E.	57 58 40	2890	56 26 8	2917	54 54 10	2946	53 22 49	2975
	SUN E.	86 12 45	2923	84 40 56	2940	83 9 28	2956	81 38 20	2972
25	Spica W.	88 30 18	2718	90 6 34	2731	91 42 33	2744	93 18 14	2756
	Antares W.	42 49 29	2782	44 24 20	2789	45 59 2	2798	47 33 32	2806
	Saturn W.	22 7 24	2697	23 44 8	2709	25 20 36	2722	26 56 47	2734
	Venus E.	38 14 11	2900	36 41 52	2922	35 10 1	2944	33 38 38	2967
	Fomalhaut E.	45 55 48	3146	44 28 34	3187	43 2 9	3230	41 36 35	3276
	SUN E.	74 7 31	3048	72 38 17	3062	71 9 21	3076	69 40 42	3091
26	Spica W.	101 12 35	2818	102 46 40	2829	104 20 31	2841	105 54 6	2851
	Antares W.	55 23 21	2849	56 56 45	2858	58 29 58	2866	60 3 0	2876
	Saturn W.	34 53 47	2791	36 28 26	2802	38 2 51	2813	39 37 2	2823
	Fomalhaut E.	34 43 49	3579	33 24 52	3660	32 7 23	3751	30 51 30	3854
	SUN E.	62 21 41	3157	60 54 40	3170	59 27 55	3182	58 1 24	3194
27	Spica W.	113 38 34	2904	115 10 48	2914	116 42 49	2925	118 14 36	2934
	Antares W.	67 45 25	2917	69 17 22	2925	70 49 9	2932	72 20 47	2940
	Saturn W.	47 24 42	2872	48 57 37	2880	50 30 21	2890	52 2 53	2898
	SUN E.	50 52 24	3252	49 27 16	3263	48 2 21	3274	46 37 39	3284
28	Antares W.	79 56 32	2977	81 27 14	2983	82 57 48	2990	84 28 13	2996
	Saturn W.	59 43 1	2936	61 14 34	2944	62 45 57	2950	64 17 12	2957
	SUN E.	39 37 13	3337	38 13 44	3347	36 50 27	3358	35 27 22	3368



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
20	Venus E.	98 22 10	2247	96 34 52	2261	94 47 55	2275	93 1 19	2291
	Fomalhaut E.	104 19 6	2373	102 34 53	2384	100 50 55	2394	99 7 12	2406
	SUN E.	131 32 43	2468	129 50 45	2481	128 9 5	2495	126 27 44	2509
21	Regulus W.	94 55 34	2258	96 42 35	2274	98 29 12	2289	100 15 27	2305
	Spica W.	41 23 28	2330	43 8 44	2340	44 53 45	2352	46 38 29	2364
	Saturn E.	25 26 54	2268	23 40 7	2284	21 53 44	2300	20 7 45	2317
	$\alpha$ Aquilæ E.	59 23 43	3134	57 56 15	3185	56 29 48	3239	55 4 25	3298
	Venus E.	84 14 0	2371	82 29 44	2387	80 45 51	2405	79 2 24	2423
	Fomalhaut E.	90 33 9	2475	88 51 21	2491	87 9 55	2507	85 28 52	2524
	SUN E.	118 6 9	2585	116 26 54	2602	114 48 2	2618	113 9 32	2635
22	Regulus W.	109 0 51	2386	110 44 46	2403	112 28 17	2418	114 11 26	2435
	Spica W.	55 17 34	2431	57 0 24	2445	58 42 54	2460	60 25 4	2474
	$\alpha$ Aquilæ E.	48 15 58	3662	46 58 31	3733	45 42 40	3852	44 28 32	3961
	Venus E.	70 31 24	2513	68 50 29	2531	67 9 59	2550	65 29 55	2569
	Fomalhaut E.	77 9 42	2616	75 31 9	2636	73 53 2	2657	72 15 24	2677
	SUN E.	105 2 42	2720	103 26 29	2738	101 50 39	2755	100 15 12	2772
23	Spica W.	68 50 44	2548	70 30 50	2563	72 10 36	2577	73 50 2	2593
	Antares W.	23 46 0	2791	25 20 40	2773	26 55 43	2762	28 31 1	2755
	Venus E.	57 16 1	2662	55 38 30	2682	54 1 26	2701	52 24 47	2720
	Fomalhaut E.	64 14 20	2788	62 39 37	2812	61 5 25	2838	59 31 46	2863
	SUN E.	92 23 32	2857	90 50 18	2874	89 17 26	2890	87 44 55	2907
24	Spica W.	82 2 14	2664	83 39 42	2678	85 16 52	2691	86 53 44	2704
	Antares W.	36 28 37	2757	38 4 1	2762	39 39 19	2769	41 14 28	2775
	Venus E.	44 27 55	2818	42 53 50	2837	41 20 10	2858	39 46 57	2879
	Fomalhaut E.	51 52 4	3006	50 21 58	3038	48 52 33	3072	47 23 49	3107
	SUN E.	80 7 32	2987	78 37 3	3002	77 6 53	3018	75 37 3	3033
25	Spica W.	94 53 39	2769	96 28 47	2782	98 3 39	2794	99 38 15	2806
	Antares W.	49 7 52	2814	50 42 2	2824	52 15 59	2832	53 49 46	2841
	Saturn W.	28 32 42	2746	30 8 21	2757	31 43 45	2769	33 18 53	2780
	Venus E.	32 7 44	2992	30 37 22	3018	29 7 32	3046	27 38 17	3076
	Fomalhaut E.	40 11 55	3326	38 48 14	3381	37 25 36	3441	36 4 6	3506
	SUN E.	68 12 21	3105	66 44 17	3118	65 16 29	3131	63 48 57	3144
26	Spica W.	107 27 28	2862	109 0 35	2873	110 33 28	2884	112 6 8	2894
	Antares W.	61 35 50	2884	63 8 30	2892	64 40 59	2901	66 13 17	2909
	Saturn W.	41 11 0	2834	42 44 44	2843	44 18 16	2853	45 51 35	2863
	Fomalhaut E.	29 37 24	3970	28 25 15	4103	27 15 16	4257	26 7 44	4437
	SUN E.	56 35 8	3206	55 9 6	3218	53 43 18	3230	52 17 44	3241
27	Spica W.	119 46 12	2943	121 17 36	2953	122 48 47	2962	124 19 47	2972
	Antares W.	73 52 15	2948	75 23 33	2955	76 54 42	2963	78 25 41	2970
	Saturn W.	53 35 15	2905	55 7 27	2914	56 39 28	2922	58 11 19	2929
	SUN E.	45 13 9	3296	43 48 52	3306	42 24 47	3316	41 0 54	3326
28	Antares W.	85 58 31	3003	87 28 40	3009	88 58 41	3015	90 28 35	3021
	Saturn W.	65 48 19	2963	67 19 18	2970	68 50 8	2976	70 20 51	2981
	SUN E.	34 4 29	3379	32 41 48	3390	31 19 20	3401	29 57 5	3413



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time. of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of	
	E	F	G	H		
1	0.85978	1.49933	0.02953	1.45606	102.367	<sup>h</sup> 23 <sup>m</sup> 25.09
2	0.85356	1.49463	0.03029	1.45577	102.875	1 19 29.19
3	0.84759	1.48986	0.03105	1.45549	103.376	1 15 33.28
4	0.84190	1.48500	0.03180	1.45521	103.874	1 11 37.37
5	0.83650	1.48008	0.03255	1.45494	104.366	1 7 41.47
6	0.83137	1.47508	0.03328	1.45468	104.852	1 3 45.56
7	0.82653	1.47001	0.03401	1.45443	105.333	0 59 49.65
8	0.82201	1.46485	0.03474	1.45419	105.808	0 55 53.75
9	0.81782	1.45961	0.03545	1.45396	106.278	0 51 57.84
10	0.81397	1.45430	0.03617	1.45374	106.740	0 48 1.93
11	0.81045	1.44891	0.03688	1.45353	107.195	0 44 6.03
12	0.80729	1.44343	0.03759	1.45333	107.646	0 40 10.12
13	0.80449	1.43788	0.03828	1.45314	108.090	0 36 14.21
14	0.80206	1.43226	0.03898	1.45295	108.527	0 32 18.31
15	0.80000	1.42654	0.03967	1.45277	108.958	0 28 22.40
16	0.79833	1.42075	0.04036	1.45261	109.380	0 24 26.49
17	0.79704	1.41488	0.04105	1.45246	109.796	0 20 30.59
18	0.79613	1.40892	0.04174	1.45232	110.204	0 16 34.68
19	0.79561	1.40289	0.04242	1.45219	110.605	0 12 38.77
20	0.79548	1.39676	0.04310	1.45206	110.999	0 8 42.87
21	0.79576	1.39055	0.04379	1.45195	111.384	0 4 46.96
22	0.79643	1.38426	0.04446	1.45185	111.762	{ 0 0 55.05 }
23	0.79748	1.37788	0.04514	1.45175	112.132	23 52 59.24
24	0.79891	1.37142	0.04582	1.45167	112.492	23 49 3.33
25	0.80072	1.36487	0.04651	1.45160	112.844	23 45 7.43
26	0.80289	1.35824	0.04719	1.45153	113.189	23 41 11.52
27	0.80544	1.35152	0.04788	1.45147	113.525	23 37 15.62
28	0.80834	1.34471	0.04858	1.45143	113.852	23 33 19.71
29	0.81160	1.33781	0.04927	1.45140	114.169	23 29 23.81
30	0.81519	1.33083	0.04996	1.45138	114.478	23 25 27.90
31	0.81911	1.32375	0.05066	1.45136	114.779	23 21 31.99
32	0.82337	1.31659	0.05135	1.45135	115.071	23 17 36.08



Day of the Month.	Bessel's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .2745, 0 <sup>h</sup> .18249.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	-1 <sup>h</sup> .2494	+0 <sup>h</sup> .8178	-9 <sup>h</sup> .1128	+0 <sup>h</sup> .5539	2404123	344	59	·1615
2	1 <sup>h</sup> .2519	0 <sup>h</sup> .7948	9 <sup>h</sup> .1064	0 <sup>h</sup> .5515	2404124	345	60	·1643
3	1 <sup>h</sup> .2543	0 <sup>h</sup> .7703	9 <sup>h</sup> .1000	0 <sup>h</sup> .5493	2404125	346	61	·1670
4	-1 <sup>h</sup> .2565	+0 <sup>h</sup> .7443	-9 <sup>h</sup> .0935	+0 <sup>h</sup> .5470	2404126	347	62	·1698
5	1 <sup>h</sup> .2586	0 <sup>h</sup> .7165	9 <sup>h</sup> .0870	0 <sup>h</sup> .5449	2404127	348	63	·1725
6	1 <sup>h</sup> .2605	0 <sup>h</sup> .6866	9 <sup>h</sup> .0805	0 <sup>h</sup> .5428	2404128	349	64	·1752
7	-1 <sup>h</sup> .2623	+0 <sup>h</sup> .6544	-9 <sup>h</sup> .0739	+0 <sup>h</sup> .5407	2404129	350	65	·1780
8	1 <sup>h</sup> .2639	0 <sup>h</sup> .6195	9 <sup>h</sup> .0672	0 <sup>h</sup> .5387	2404130	351	66	·1807
9	1 <sup>h</sup> .2654	0 <sup>h</sup> .5815	9 <sup>h</sup> .0605	0 <sup>h</sup> .5368	2404131	352	67	·1834
10	-1 <sup>h</sup> .2668	+0 <sup>h</sup> .5396	-9 <sup>h</sup> .0537	+0 <sup>h</sup> .5350	2404132	353	68	·1862
11	1 <sup>h</sup> .2680	0 <sup>h</sup> .4932	9 <sup>h</sup> .0468	0 <sup>h</sup> .5332	2404133	354	69	·1889
12	1 <sup>h</sup> .2691	0 <sup>h</sup> .4411	9 <sup>h</sup> .0399	0 <sup>h</sup> .5315	2404134	355	70	·1917
13	-1 <sup>h</sup> .2701	+0 <sup>h</sup> .3817	-9 <sup>h</sup> .0328	+0 <sup>h</sup> .5299	2404135	356	71	·1944
14	1 <sup>h</sup> .2709	0 <sup>h</sup> .3129	9 <sup>h</sup> .0257	0 <sup>h</sup> .5284	2404136	357	72	·1971
15	1 <sup>h</sup> .2716	0 <sup>h</sup> .2309	9 <sup>h</sup> .0185	0 <sup>h</sup> .5269	2404137	358	73	·1999
16	-1 <sup>h</sup> .2722	+0 <sup>h</sup> .1297	-9 <sup>h</sup> .0112	+0 <sup>h</sup> .5255	2404138	359	74	·2026
17	1 <sup>h</sup> .2726	9 <sup>h</sup> .9975	9 <sup>h</sup> .0038	0 <sup>h</sup> .5243	2404139	360	75	·2053
18	1 <sup>h</sup> .2729	9 <sup>h</sup> .8063	8 <sup>h</sup> .9962	0 <sup>h</sup> .5230	2404140	361	76	·2081
19	-1 <sup>h</sup> .2731	+9 <sup>h</sup> .4565	-8 <sup>h</sup> .9885	+0 <sup>h</sup> .5219	2404141	362	77	·2108
20	1 <sup>h</sup> .2731	-8 <sup>h</sup> .8319	8 <sup>h</sup> .9807	0 <sup>h</sup> .5209	2404142	363	78	·2136
21	1 <sup>h</sup> .2730	9 <sup>h</sup> .6249	8 <sup>h</sup> .9728	0 <sup>h</sup> .5199	2404143	364	79	·2163
22	-1 <sup>h</sup> .2728	-9 <sup>h</sup> .8894	-8 <sup>h</sup> .9647	+0 <sup>h</sup> .5190	2404144	365	80	·2190
23	1 <sup>h</sup> .2725	0 <sup>h</sup> .0524	8 <sup>h</sup> .9565	0 <sup>h</sup> .5182	2404145	0	81	·2218
24	1 <sup>h</sup> .2720	0 <sup>h</sup> .1705	8 <sup>h</sup> .9480	0 <sup>h</sup> .5175	2404146	1	82	·2245
25	-1 <sup>h</sup> .2714	-0 <sup>h</sup> .2631	-8 <sup>h</sup> .9394	+0 <sup>h</sup> .5169	2404147	2	83	·2272
26	1 <sup>h</sup> .2706	0 <sup>h</sup> .3393	8 <sup>h</sup> .9304	0 <sup>h</sup> .5163	2404148	3	84	·2300
27	1 <sup>h</sup> .2698	0 <sup>h</sup> .4039	8 <sup>h</sup> .9213	0 <sup>h</sup> .5158	2404149	4	85	·2327
28	-1 <sup>h</sup> .2688	-0 <sup>h</sup> .4600	-8 <sup>h</sup> .9120	+0 <sup>h</sup> .5155	2404150	5	86	·2355
29	1 <sup>h</sup> .2676	0 <sup>h</sup> .5095	8 <sup>h</sup> .9024	0 <sup>h</sup> .5152	2404151	6	87	·2382
30	1 <sup>h</sup> .2664	0 <sup>h</sup> .5538	8 <sup>h</sup> .8925	0 <sup>h</sup> .5149	2404152	7	88	·2409
31	1 <sup>h</sup> .2650	0 <sup>h</sup> .5939	8 <sup>h</sup> .8824	0 <sup>h</sup> .5148	2404153	8	89	·2437
32	-1 <sup>h</sup> .2634	-0 <sup>h</sup> .6305	-8 <sup>h</sup> .8720	+0 <sup>h</sup> .5147	2404154	9	90	·2464

\* Add .0026 if Fraction be required for the time 4, see page 329.

\* Add .0026 if Fraction be required for the time 4, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be added to subtr. from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Frid.	1	<sup>h</sup> 0 <sup>m</sup> 42 <sup>s</sup> 30·67	9·100	N. 4 34 29·5	57·84	<sup>m</sup> 4·49	3 55·70	0·754
Sat.	2	0 46 9·14	9·105	4 57 35·1	57·63	4·51	3 37·66	0·749
Sun.	3	0 49 47·73	9·111	5 20 35·5	57·40	4·53	3 19·74	0·744
Mon.	4	0 53 26·47	9·117	5 43 30·2	57·15	4·55	3 1·97	0·737
Tues.	5	0 57 5·36	9·124	6 6 18·9	56·90	4·58	2 44·37	0·730
Wed.	6	1 0 44·42	9·132	6 29 1·3	56·63	4·61	2 26·93	0·723
Thur.	7	1 4 23·68	9·140	6 51 36·9	56·34	4·64	2 9·67	0·715
Frid.	8	1 8 3·14	9·149	7 14 5·5	56·04	4·67	1 52·63	0·706
Sat.	9	1 11 42·83	9·159	7 36 26·7	55·72	4·71	1 35·82	0·696
Sun.	10	1 15 22·75	9·169	7 58 40·1	55·39	4·75	1 19·23	0·686
Mon.	11	1 19 2·92	9·180	8 20 45·4	55·04	4·79	1 2·90	0·675
Tues.	12	1 22 43·37	9·191	8 42 42·1	54·68	4·83	0 46·84	0·663
Wed.	13	1 26 24·11	9·204	9 4 30·1	54·31	4·88	0 31·06	0·651
Thur.	14	1 30 5·15	9·217	9 26 9·0	53·92	4·93	0 15·60	0·638
Frid.	15	1 33 46·52	9·231	9 47 38·4	53·52	4·98	0 0·46	0·624
Sat.	16	1 37 28·26	9·247	10 8 58·1	53·11	5·03	0 14·33	0·608
Sun.	17	1 41 10·37	9·263	10 30 7·7	52·69	5·09	0 28·74	0·592
Mon.	18	1 44 52·87	9·280	10 51 7·1	52·25	5·15	0 42·74	0·575
Tues.	19	1 48 35·79	9·297	11 11 55·9	51·80	5·21	0 56·33	0·557
Wed.	20	1 52 19·14	9·316	11 32 33·7	51·34	5·27	1 9·50	0·540
Thur.	21	1 56 2·94	9·334	11 53 0·2	50·86	5·33	1 22·23	0·521
Frid.	22	1 59 47·19	9·354	12 13 15·2	50·38	5·39	1 34·50	0·502
Sat.	23	2 3 31·91	9·373	12 33 18·3	49·88	5·46	1 46·31	0·482
Sun.	24	2 7 17·10	9·393	12 53 9·1	49·36	5·53	1 57·64	0·461
Mon.	25	2 11 2·79	9·414	13 12 47·4	48·83	5·60	2 8·46	0·441
Tues.	26	2 14 48·98	9·435	13 32 12·7	48·28	5·67	2 18·79	0·420
Wed.	27	2 18 35·68	9·456	13 51 24·8	47·72	5·75	2 28·62	0·399
Thur.	28	2 22 22·89	9·478	14 10 23·3	47·15	5·82	2 37·94	0·377
Frid.	29	2 26 10·63	9·500	14 29 7·8	46·56	5·89	2 46·73	0·355
Sat.	30	2 29 58·90	9·522	14 47 38·2	45·96	5·97	2 55·00	0·333
Sun.	31	2 33 47·70	9·545	N. 15 5 54·1	45·35	6·05	3 2·73	0·311

Mean Time of the Semidiameter passing may be found by subtracting 0·18 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subt. from added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		h m s	N. ° ' "	' "	m s	h m s
Frid.	1	0 42 30.07	N. 4 34 25.7	16 1.8	3 55.75	0 38 34.32
Sat.	2	0 46 8.58	4 57 31.6	16 1.5	3 37.70	0 42 30.88
Sun.	3	0 49 47.22	5 20 32.3	16 1.3	3 19.78	0 46 27.44
Mon.	4	0 53 26.00	5 43 27.3	16 1.0	3 2.01	0 50 23.99
Tues.	5	0 57 4.94	6 6 16.3	16 0.7	2 44.40	0 54 20.54
Wed.	6	1 0 44.05	6 28 59.0	16 0.5	2 26.96	0 58 17.09
Thur.	7	1 4 23.35	6 51 34.9	16 0.2	2 9.70	1 2 13.65
Frid.	8	1 8 2.86	7 14 3.8	15 59.9	1 52.66	1 6 10.20
Sat.	9	1 11 42.59	7 36 25.2	15 59.7	1 35.84	1 10 6.75
Sun.	10	1 15 22.55	7 58 38.9	15 59.4	1 19.25	1 14 3.30
Mon.	11	1 19 2.76	8 20 44.4	15 59.1	1 2.91	1 17 59.85
Tues.	12	1 22 43.25	8 42 41.4	15 58.9	0 46.85	1 21 56.40
Wed.	13	1 26 24.03	9 4 29.7	15 58.6	0 31.07	1 25 52.96
Thur.	14	1 30 5.11	9 26 8.7	15 58.3	0.15.60	1 29 49.51
Frid.	15	1 33 46.52	9 47 38.3	15 58.1	0 0.46	1 33 46.06
Sat.	16	1 37 28.29	10 8 58.3	15 57.8	0 14.33	1 37 42.62
Sun.	17	1 41 10.44	10 30 8.2	15 57.5	0 28.74	1 41 39.18
Mon.	18	1 44 52.98	10 51 7.7	15 57.2	0 42.75	1 45 35.73
Tues.	19	1 48 35.94	11 11 56.7	15 57.0	0 56.34	1 49 32.28
Wed.	20	1 52 19.32	11 32 34.7	15 56.7	1 9.51	1 53 28.83
Thur.	21	1 56 3.15	11 53 1.4	15 56.5	1 22.24	1 57 25.39
Frid.	22	1 59 47.44	12 13 16.5	15 56.2	1 34.51	2 1 21.95
Sat.	23	2 3 32.19	12 33 19.8	15 56.0	1 46.32	2 5 18.51
Sun.	24	2 7 17.41	12 53 10.8	15 55.7	1 57.65	2 9 15.06
Mon.	25	2 11 3.13	13 12 49.1	15 55.4	2 8.48	2 13 11.61
Tues.	26	2 14 49.35	13 32 14.6	15 55.2	2 18.81	2 17 8.16
Wed.	27	2 18 26.07	13 51 26.8	15 54.9	2 28.64	2 21 4.71
Thur.	28	2 22 23.31	14 10 25.4	15 54.7	2 37.96	2 25 1.27
Frid.	29	2 26 11.07	14 29 10.1	15 54.5	2 46.75	2 28 57.82
Sat.	30	2 29 59.36	14 47 40.5	15 54.2	2 55.02	2 32 54.38
Sun.	31	2 33 48.18	N. 15 5 56.4	15 54.0	3 2.75	2 36 50.93

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	11 33 27.1	S. 0.78	0.0000019	14 43.7	14 43.2	53 57.7	53 55.9
2	12 32 35.3	0.80	0.0001263	14 43.1	14 43.4	53 55.5	53 56.6
3	13 31 41.4	0.80	0.0002500	14 44.1	14 45.2	53 59.1	54 3.2
4	14 30 45.4	0.78	0.0003730	14 46.8	14 48.8	54 9.0	54 16.5
5	15 29 47.3	0.72	0.0004954	14 51.4	14 54.5	54 25.9	54 37.3
6	16 28 47.0	0.65	0.0006173	14 58.2	15 2.4	54 50.7	55 6.2
7	17 27 44.4	0.55	0.0007386	15 7.2	15 12.6	55 23.8	55 43.4
8	18 26 39.5	0.44	0.0008594	15 18.5	15 24.9	56 5.0	56 28.5
9	19 25 32.4	0.32	0.0009799	15 31.8	15 39.1	56 53.8	57 20.5
10	20 24 23.0	0.20	0.0011001	15 46.7	15 54.5	57 48.4	58 17.0
11	21 23 11.2	S. 0.08	0.0012200	16 2.3	16 10.1	58 45.8	59 14.2
12	22 21 57.1	N. 0.03	0.0013398	16 17.6	16 24.6	59 41.6	60 7.3
13	23 20 40.7	0.13	0.0014595	16 30.9	16 36.4	60 30.6	60 50.7
14	24 19 22.2	0.19	0.0015793	16 40.9	16 44.1	61 7.0	61 18.9
15	25 18 1.6	0.22	0.0016993	16 46.0	16 46.6	61 25.9	61 27.9
16	26 16 39.0	0.22	0.0018194	16 45.7	16 43.4	61 24.7	61 16.4
17	27 15 14.6	0.18	0.0019396	16 39.9	16 35.2	61 3.4	60 46.1
18	28 13 48.5	N. 0.11	0.0020598	16 29.4	16 22.9	60 25.1	60 1.2
19	29 12 20.7	0.00	0.0021799	16 15.8	16 8.2	59 35.0	59 7.3
20	30 10 51.2	S. 0.12	0.0022997	16 0.4	15 52.5	58 38.7	58 9.9
21	31 9 20.1	0.26	0.0024191	15 44.8	15 37.2	57 41.5	57 13.8
22	32 7 47.4	0.39	0.0025378	15 30.0	15 23.2	56 47.4	56 22.5
23	33 6 13.1	0.51	0.0026558	15 16.9	15 11.1	55 59.4	55 38.2
24	34 4 37.2	0.62	0.0027729	15 5.9	15 1.3	55 19.1	55 2.0
25	35 2 59.7	0.72	0.0028889	14 57.2	14 53.7	54 47.0	54 34.1
26	36 1 20.6	0.81	0.0030036	14 50.7	14 48.2	54 23.2	54 14.2
27	36 59 39.9	0.87	0.0031170	14 46.3	14 44.8	54 7.0	54 1.6
28	37 57 57.5	0.90	0.0032290	14 43.8	14 43.2	53 57.9	53 55.8
29	38 56 13.4	0.92	0.0033396	14 43.0	14 43.2	53 55.1	53 55.9
30	39 54 27.7	0.91	0.0034487	14 43.8	14 44.8	53 58.1	54 1.5
31	40 52 40.3	S. 0.87	0.0035562	14 46.1	14 47.7	54 6.3	54 12.3



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	THE MOON'S						
		Longitude.		Latitude.		Age.	Meridian	
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.	
Frid.	1	16° 6' 58".1	22° 3' 17".0	S. 4° 56' 22".6	S. 4° 59' 37".2	0.4	h m 0 29.2	
Sat.	2	27 59 15.7	33 55 5.1	4 59 36.1	4 56 19.7	1.4	1 10.6	
Sun.	3	39 50 57.1	45 47 6.3	4 49 50.3	4 40 11.2	2.4	1 52.7	
Mon.	4	51 43 48.7	57 41 23.1	4 27 27.7	4 11 46.2	3.4	2 36.2	
Tues.	5	63 40 11.0	69 40 36.6	3 53 14.2	3 32 0.8	4.4	3 21.6	
Wed.	6	75 43 6.7	81 48 10.9	3 8 16.1	2 42 11.6	5.4	4 9.2	
Thur.	7	87 56 21.0	94 8 10.7	2 14 0.0	1 43 55.8	6.4	4 59.1	
Frid.	8	100 24 14.9	106 45 8.9	1 12 15.1	S. 0 39 15.9	7.4	5 51.1	
Sat.	9	113 11 27.9	119 43 45.0	S. 0 5 18.6	N. 0 29 13.8	8.4	6 44.5	
Sun.	10	126 22 30.7	133 8 10.5	N. 1 3 55.9	1 38 18.9	9.4	7 38.8	
Mon.	11	140 1 3.6	147 1 20.4	2 11 51.7	2 44 0.0	10.4	8 33.3	
Tues.	12	154 9 1.1	161 23 53.6	3 14 7.5	3 41 36.7	11.4	9 27.6	
Wed.	13	168 45 31.8	176 13 15.4	4 5 50.2	4 26 11.9	12.4	10 21.8	
Thur.	14	183 46 9.6	191 23 6.4	4 42 9.0	4 53 14.5	13.4	11 16.1	
Frid.	15	199 2 46.7	206 43 44.1	4 59 8.3	4 59 39.0	14.4	12 11.1	
Sat.	16	214 24 28.0	222 3 28.9	4 54 44.8	4 44 33.7	15.4	13 7.2	
Sun.	17	229 39 22.3	237 10 52.6	4 29 23.1	4 9 38.1	16.4	14 4.7	
Mon.	18	244 36 55.8	251 56 41.9	3 45 50.3	3 18 35.4	17.4	15 3.2	
Tues.	19	259 9 35.2	266 15 14.0	2 48 31.8	2 16 18.1	18.4	16 1.9	
Wed.	20	273 13 30.3	280 4 27.3	1 42 32.3	N. 1 7 50.2	19.4	16 59.4	
Thur.	21	286 48 18.2	293 25 24.0	N. 0 32 45.2	S. 0 2 12.6	20.4	17 54.6	
Frid.	22	299 56 11.6	306 21 11.7	S. 0 36 36.1	1 10 1.2	21.4	18 46.8	
Sat.	23	312 40 57.9	318 56 4.9	1 42 6.6	2 12 33.6	22.4	19 35.7	
Sun.	24	325 7 7.3	331 14 39.3	2 41 5.7	3 7 28.4	23.4	20 21.7	
Mon.	25	337 19 13.6	343 21 20.4	3 31 28.8	3 52 55.6	24.4	21 5.4	
Tues.	26	349 21 28.4	355 20 3.1	4 11 39.0	4 27 30.2	25.4	21 47.4	
Wed.	27	1 17 27.7	7 14 2.6	4 40 22.0	4 50 8.3	26.4	22 28.6	
Thur.	28	13 10 5.7	19 5 52.7	4 56 44.5	5 0 7.2	27.4	23 9.7	
Frid.	29	25 1 37.2	30 57 31.5	5 0 14.6	4 57 6.5	28.4	23 51.5	
Sat.	30	36 53 46.5	42 50 32.6	4 50 44.3	4 41 10.8	29.4	6	
Sun.	31	48 47 59.8	54 46 18.5	S. 4 28 31.0	S. 4 12 51.1	0.7	0 34.6	



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 1.</b>				<b>SUNDAY 3.</b>			
0	h m s 1 6 58.83	N. 1 46 53.0	109.49	0	h m s 2 35 57.44	N. 10 11 18.8	98.17
1	1 8 48.91	1 57 49.7	109.41	1	2 37 50.85	10 21 6.7	97.78
2	1 10 38.99	2 8 45.9	109.32	2	2 39 44.38	10 30 52.1	97.37
3	1 12 29.08	2 19 41.6	109.23	3	2 41 38.05	10 40 35.1	96.97
4	1 14 19.19	2 30 36.7	109.13	4	2 43 31.85	10 50 15.7	96.56
5	1 16 9.32	2 41 31.2	109.02	5	2 45 25.79	10 59 53.8	96.13
6	1 17 59.46	2 52 24.9	108.90	6	2 47 19.86	11 9 29.2	95.69
7	1 19 49.63	3 3 18.0	108.78	7	2 49 14.08	11 19 2.1	95.26
8	1 21 39.82	3 14 10.3	108.65	8	2 51 8.44	11 28 32.4	94.82
9	1 23 30.04	3 25 1.8	108.52	9	2 53 2.94	11 37 59.9	94.37
10	1 25 20.29	3 35 52.5	108.38	10	2 54 57.59	11 47 24.8	93.92
11	1 27 10.57	3 46 42.4	108.23	11	2 56 52.38	11 56 46.9	93.45
12	1 29 0.89	3 57 31.3	108.07	12	2 58 47.33	12 6 6.2	92.98
13	1 30 51.25	4 8 19.3	107.91	13	3 0 42.43	12 15 22.7	92.50
14	1 32 41.64	4 19 6.2	107.74	14	3 2 37.69	12 24 36.2	92.02
15	1 34 32.08	4 29 52.2	107.57	15	3 4 33.10	12 33 46.9	91.53
16	1 36 22.56	4 40 37.1	107.39	16	3 6 28.67	12 42 54.6	91.03
17	1 38 13.09	4 51 20.9	107.20	17	3 8 24.41	12 51 59.3	90.53
18	1 40 3.68	5 2 3.5	107.00	18	3 10 20.30	13 1 1.0	90.02
19	1 41 54.32	5 12 44.9	106.81	19	3 12 16.36	13 9 59.6	89.50
20	1 43 45.01	5 23 25.2	106.61	20	3 14 12.59	13 18 55.0	88.97
21	1 45 35.76	5 34 4.2	106.39	21	3 16 8.99	13 27 47.2	88.44
22	1 47 26.57	5 44 41.9	106.17	22	3 18 5.56	13 36 36.3	87.91
23	1 49 17.45	N. 5 55 18.3	105.95	23	3 20 2.29	N. 13 45 22.1	87.36
<b>SATURDAY 2.</b>				<b>MONDAY 4.</b>			
0	1 51 8.39	N. 6 5 53.3	105.72	0	3 21 59.20	N. 13 54 4.6	86.81
1	1 52 59.40	6 16 26.9	105.48	1	3 23 56.29	14 2 43.8	86.25
2	1 54 50.48	6 26 59.0	105.23	2	3 25 53.55	14 11 19.6	85.68
3	1 56 41.64	6 37 29.6	104.98	3	3 27 51.00	14 19 52.0	85.12
4	1 58 32.88	6 47 58.7	104.72	4	3 29 48.62	14 28 21.0	84.54
5	2 0 24.19	6 58 26.3	104.46	5	3 31 46.43	14 36 46.5	83.95
6	2 2 15.58	7 8 52.2	104.18	6	3 33 44.42	14 45 8.4	83.36
7	2 4 7.06	7 19 16.5	103.91	7	3 35 42.60	14 53 26.8	82.76
8	2 5 58.63	7 29 39.1	103.62	8	3 37 40.97	15 1 41.5	82.15
9	2 7 50.29	7 39 59.9	103.33	9	3 39 39.52	15 9 52.6	81.54
10	2 9 42.03	7 50 19.0	103.03	10	3 41 38.26	15 18 0.0	80.92
11	2 11 33.87	8 0 36.3	102.73	11	3 43 37.20	15 26 3.7	80.29
12	2 13 25.81	8 10 51.8	102.42	12	3 45 36.33	15 34 3.5	79.65
13	2 15 17.84	8 21 5.3	102.10	13	3 47 35.65	15 41 59.5	79.02
14	2 17 9.98	8 31 17.0	101.78	14	3 49 35.17	15 49 51.7	78.38
15	2 19 2.22	8 41 26.7	101.44	15	3 51 34.89	15 57 40.0	77.72
16	2 20 54.57	8 51 34.3	101.10	16	3 53 34.81	16 5 24.3	77.06
17	2 22 47.02	9 1 39.9	100.77	17	3 55 34.93	16 13 4.7	76.39
18	2 24 39.59	9 11 43.5	100.42	18	3 57 35.25	16 20 41.0	75.71
19	2 26 32.27	9 21 44.9	100.06	19	3 59 35.77	16 28 13.2	75.02
20	2 28 25.06	9 31 44.2	99.70	20	4 1 36.49	16 35 41.3	74.33
21	2 30 17.97	9 41 41.3	99.33	21	4 3 37.42	16 43 5.2	73.64
22	2 32 11.01	9 51 36.1	98.94	22	4 5 38.56	16 50 25.0	72.94
23	2 34 4.16	10 1 28.6	98.56	23	4 7 39.90	16 57 40.5	72.23
24	2 35 57.44	N. 10 11 18.8	98.17	24	4 9 41.45	N. 17 4 51.7	71.51



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 5.</b>				<b>THURSDAY 7.</b>			
0	4 9 41.45	N.17 4 51.7	71.51	0	5 51 9.86	N.21 12 21.6	29.03
1	4 11 43.21	17 11 58.6	70.78	1	5 53 21.94	21 15 12.7	28.00
2	4 13 45.18	17 19 1.1	70.05	2	5 55 34.23	21 17 57.6	26.95
3	4 15 47.36	17 25 59.2	69.32	3	5 57 46.71	21 20 36.1	25.88
4	4 17 49.76	17 32 52.9	68.58	4	5 59 59.39	21 23 8.2	24.82
5	4 19 52.36	17 39 42.1	67.83	5	6 2 12.27	21 25 34.0	23.76
6	4 21 55.18	17 46 26.8	67.07	6	6 4 25.34	21 27 53.4	22.69
7	4 23 58.21	17 53 6.9	66.29	7	6 6 38.61	21 30 6.3	21.61
8	4 26 1.46	17 59 42.3	65.52	8	6 8 52.07	21 32 12.7	20.53
9	4 28 4.92	18 6 13.1	64.74	9	6 11 5.72	21 34 12.6	19.44
10	4 30 8.60	18 12 39.2	63.96	10	6 13 19.56	21 36 6.0	18.34
11	4 32 12.50	18 19 0.6	63.16	11	6 15 33.58	21 37 52.7	17.23
12	4 34 16.61	18 25 17.1	62.35	12	6 17 47.79	21 39 32.8	16.13
13	4 36 20.94	18 31 28.8	61.55	13	6 20 2.18	21 41 6.3	15.02
14	4 38 25.49	18 37 35.7	60.74	14	6 22 16.76	21 42 33.1	13.91
15	4 40 30.25	18 43 37.7	59.92	15	6 24 31.51	21 43 53.2	12.79
16	4 42 35.24	18 49 34.7	59.08	16	6 26 46.44	21 45 6.6	11.67
17	4 44 40.45	18 55 26.7	58.25	17	6 29 1.54	21 46 13.2	10.53
18	4 46 45.87	19 1 13.7	57.41	18	6 31 16.82	21 47 13.0	9.39
19	4 48 51.51	19 6 55.6	56.56	19	6 33 32.27	21 48 5.9	8.25
20	4 50 57.38	19 12 32.4	55.70	20	6 35 47.88	21 48 52.0	7.12
21	4 53 3.46	19 18 4.0	54.83	21	6 38 3.67	21 49 31.3	5.97
22	4 55 9.76	19 23 30.4	53.97	22	6 40 19.62	21 50 3.6	4.81
23	4 57 16.29	N.19 28 51.6	53.09	23	6 42 35.73	N.21 50 29.0	3.66
<b>WEDNESDAY 6.</b>				<b>FRIDAY 8.</b>			
0	4 59 23.03	N.19 34 7.5	52.21	0	6 44 52.00	N.21 50 47.5	2.50
1	5 1 29.99	19 39 18.1	51.32	1	6 47 8.43	21 50 59.0	1.33
2	5 3 37.17	19 44 23.3	50.42	2	6 49 25.01	21 51 3.5	0.16
3	5 5 44.58	19 49 23.1	49.52	3	6 51 41.75	21 51 0.9	1.02
4	5 7 52.20	19 54 17.5	48.61	4	6 53 58.64	21 50 51.3	2.19
5	5 10 0.04	19 59 6.4	47.69	5	6 56 15.68	21 50 34.6	3.38
6	5 12 8.10	20 3 49.8	46.77	6	6 58 32.86	21 50 10.7	4.57
7	5 14 16.37	20 8 27.6	45.83	7	7 0 50.18	21 49 39.8	5.75
8	5 16 24.87	20 12 59.8	44.89	8	7 3 7.64	21 49 1.7	6.94
9	5 18 33.58	20 17 26.3	43.95	9	7 5 25.24	21 48 16.5	8.13
10	5 20 42.51	20 21 47.2	43.01	10	7 7 42.98	21 47 24.1	9.34
11	5 22 51.66	20 26 2.4	42.05	11	7 10 0.85	21 46 24.4	10.55
12	5 25 1.02	20 30 11.8	41.08	12	7 12 18.85	21 45 17.5	11.75
13	5 27 10.60	20 34 15.4	40.12	13	7 14 36.98	21 44 3.4	12.95
14	5 29 20.39	20 38 13.2	39.14	14	7 16 55.23	21 42 42.1	14.17
15	5 31 30.39	20 42 5.1	38.16	15	7 19 13.61	21 41 13.4	15.38
16	5 33 40.61	20 45 51.1	37.17	16	7 21 32.10	21 39 37.5	16.59
17	5 35 51.03	20 49 31.1	36.17	17	7 23 50.71	21 37 54.3	17.82
18	5 38 1.67	20 53 5.1	35.17	18	7 26 9.44	21 36 3.7	19.04
19	5 40 12.52	20 56 33.1	34.17	19	7 28 28.27	21 34 5.8	20.26
20	5 42 23.58	20 59 55.1	33.16	20	7 30 47.22	21 32 0.6	21.48
21	5 44 34.84	21 3 11.0	32.13	21	7 33 6.27	21.29 48.0	22.72
22	5 46 46.31	21 6 20.7	31.11	22	7 35 25.42	21 27 28.0	23.94
23	5 48 57.98	21 9 24.3	30.08	23	7 37 44.67	21 25 0.7	25.17
24	5 51 9.86	N.21 12 21.6	29.03	24	7 40 4.02	N.21 22 25.9	26.41



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 9.</b>				<b>MONDAY 11.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	7 40 4.02	N. 21 22 25.9	26.41	0	9 32 36.95	N. 16 54 9.6	84.55
1	7 42 23.47	21 19 43.8	27.64	1	9 34 58.06	16 45 38.9	85.67
2	7 44 43.00	21 16 54.2	28.87	2	9 37 19.15	16 37 1.5	86.79
3	7 47 2.63	21 13 57.3	30.11	3	9 39 40.23	16 28 17.4	87.91
4	7 49 22.35	21 10 52.9	31.35	4	9 42 1.30	16 19 26.6	89.02
5	7 51 42.15	21 7 41.1	32.59	5	9 44 22.35	16 10 29.1	90.12
6	7 54 2.02	21 4 21.8	33.83	6	9 46 43.39	16 1 25.1	91.21
7	7 56 21.98	21 0 55.1	35.07	7	9 49 4.41	15 52 14.6	92.30
8	7 58 42.02	20 57 21.0	36.31	8	9 51 25.41	15 42 57.5	93.38
9	8 1 2.12	20 53 39.4	37.55	9	9 53 46.39	15 33 34.0	94.45
10	8 3 22.30	20 49 50.4	38.78	10	9 56 7.35	15 24 4.1	95.52
11	8 5 42.54	20 45 54.0	40.02	11	9 58 28.29	15 14 27.8	96.58
12	8 8 2.85	20 41 50.1	41.27	12	10 0 49.22	15 4 45.2	97.62
13	8 10 23.22	20 37 38.8	42.51	13	10 3 10.12	14 54 56.4	98.66
14	8 12 43.65	20 33 20.0	43.75	14	10 5 31.01	14 45 1.3	99.70
15	8 15 4.14	20 28 53.8	44.99	15	10 7 51.87	14 35 0.0	100.72
16	8 17 24.69	20 24 20.1	46.23	16	10 10 12.71	14 24 52.7	101.73
17	8 19 45.28	20 19 39.1	47.46	17	10 12 33.52	14 14 39.3	102.74
18	8 22 5.92	20 14 50.6	48.70	18	10 14 54.31	14 4 19.8	103.74
19	8 24 26.61	20 9 54.7	49.94	19	10 17 15.08	13 53 54.4	104.73
20	8 26 47.35	20 4 51.3	51.17	20	10 19 35.83	13 43 23.1	105.71
21	8 29 8.12	19 59 40.6	52.40	21	10 21 56.56	13 32 45.9	106.68
22	8 31 28.94	19 54 22.5	53.63	22	10 24 17.26	13 22 3.0	107.63
23	8 33 49.79	N. 19 48 57.0	54.87	23	10 26 37.94	N. 13 11 14.3	108.59
<b>SUNDAY 10.</b>				<b>TUESDAY 12.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	8 36 10.67	N. 19 43 24.1	56.09	0	10 28 58.59	N. 13 0 19.9	109.53
1	8 38 31.59	19 37 43.9	57.32	1	10 31 19.22	12 49 19.9	110.46
2	8 40 52.54	19 31 56.3	58.55	2	10 33 39.83	12 38 14.4	111.38
3	8 43 13.52	19 26 1.3	59.77	3	10 36 0.42	12 27 3.4	112.28
4	8 45 34.53	19 19 59.1	60.98	4	10 38 20.99	12 15 47.0	113.18
5	8 47 55.56	19 13 49.6	62.20	5	10 40 41.54	12 4 25.2	114.07
6	8 50 16.61	19 7 32.7	63.42	6	10 43 2.07	11 52 58.1	114.95
7	8 52 37.67	19 1 8.6	64.62	7	10 45 22.57	11 41 25.8	115.82
8	8 54 58.76	18 54 37.3	65.82	8	10 47 43.06	11 29 48.3	116.68
9	8 57 19.86	18 47 58.7	67.02	9	10 50 3.53	11 18 5.7	117.52
10	8 59 40.97	18 41 13.0	68.22	10	10 52 23.98	11 6 18.1	118.35
11	9 2 2.10	18 34 20.0	69.42	11	10 54 44.41	10 54 25.5	119.17
12	9 4 23.23	18 27 19.9	70.61	12	10 57 4.82	10 42 28.1	119.98
13	9 6 44.37	18 20 12.7	71.80	13	10 59 25.22	10 30 25.8	120.77
14	9 9 5.52	18 12 58.3	72.99	14	11 1 45.60	10 18 18.8	121.55
15	9 11 26.67	18 5 36.8	74.17	15	11 4 5.97	10 6 7.2	122.32
16	9 13 47.82	17 58 8.3	75.33	16	11 6 26.32	9 53 50.9	123.09
17	9 16 8.98	17 50 32.8	76.50	17	11 8 46.66	9 41 30.1	123.83
18	9 18 30.13	17 42 50.3	77.68	18	11 11 6.99	9 29 4.9	124.57
19	9 20 51.28	17 35 0.7	78.84	19	11 13 27.31	9 16 35.3	125.28
20	9 23 12.43	17 27 4.2	79.98	20	11 15 47.62	9 4 1.5	125.99
21	9 25 33.57	17 19 0.9	81.13	21	11 18 7.93	8 51 23.4	126.69
22	9 27 54.71	17 10 50.6	82.28	22	11 20 28.22	8 38 41.2	127.37
23	9 30 15.84	17 2 33.5	83.42	23	11 22 48.51	8 25 55.0	128.03
24	9 32 36.95	N. 16 54 9.6	84.55	24	11 25 8.80	N. 8 13 4.8	128.69



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 13.</b>				<b>FRIDAY 15.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
1	11 25 8.80	N. 8 13 4.8	128.69	1	13 17 51.70	S. 2 50 50.2	141.54
2	11 27 29.08	8 0 10.7	129.33	2	13 20 14.00	3 4 59.0	141.38
3	11 29 49.37	7 47 12.8	129.96	3	13 22 36.39	3 19 6.8	141.21
4	11 32 9.65	7 34 11.2	130.57	4	13 24 58.87	3 33 13.5	141.02
5	11 34 29.93	7 21 6.0	131.16	5	13 27 21.45	3 47 19.0	140.81
6	11 36 50.22	7 7 57.3	131.74	6	13 29 44.13	4 1 23.2	140.58
7	11 39 10.52	6 54 45.1	132.32	7	13 32 6.90	4 15 26.0	140.33
8	11 41 30.82	6 41 29.5	132.88	8	13 34 29.77	4 29 27.2	140.07
9	11 43 51.13	6 28 10.6	133.42	9	13 36 52.74	4 43 26.8	139.78
10	11 46 11.45	6 14 48.5	133.93	10	13 39 15.82	4 57 24.6	139.48
11	11 48 31.78	6 1 23.4	134.44	11	13 41 39.00	5 11 20.5	139.16
12	11 50 52.12	5 47 55.2	134.94	12	13 44 2.28	5 25 14.5	138.82
13	11 53 12.47	5 34 24.1	135.42	13	13 46 25.67	5 39 6.3	138.46
14	11 55 32.85	5 20 50.2	135.88	14	13 48 49.17	5 52 56.0	138.08
15	11 57 53.24	5 7 13.6	136.33	15	13 51 12.79	6 6 43.3	137.68
16	12 0 13.65	4 53 34.3	136.76	16	13 53 36.51	6 20 28.2	137.27
17	12 2 34.09	4 39 52.5	137.17	17	13 56 0.35	6 34 10.6	136.85
18	12 4 54.55	4 26 8.2	137.57	18	13 58 24.30	6 47 50.4	136.40
19	12 7 15.03	4 12 21.6	137.96	19	14 0 48.37	7 1 27.4	135.93
20	12 9 35.55	3 58 32.7	138.33	20	14 3 12.55	7 15 1.5	135.44
21	12 11 56.09	3 44 41.7	138.68	21	14 5 36.86	7 28 32.7	134.95
22	12 14 16.67	3 30 48.6	139.02	22	14 8 1.28	7 42 0.9	134.42
23	12 16 37.28	3 16 53.5	139.34	23	14 10 25.82	7 55 25.8	133.88
24	12 18 57.92	N. 3 2 56.5	139.64	24	14 12 50.49	S. 8 8 47.5	133.33
<b>THURSDAY 14.</b>				<b>SATURDAY 16.</b>			
0	12 21 18.60	N. 2 48 57.8	139.92	0	14 15 15.27	S. 8 22 5.8	132.76
1	12 23 39.32	2 34 57.5	140.18	1	14 17 40.18	8 35 20.6	132.17
2	12 26 0.08	2 20 55.6	140.44	2	14 20 5.22	8 48 31.8	131.56
3	12 28 20.89	2 6 52.2	140.67	3	14 22 30.38	9 1 39.3	130.93
4	12 30 41.75	1 52 47.5	140.89	4	14 24 55.66	9 14 43.0	130.29
5	12 33 2.65	1 38 41.5	141.09	5	14 27 21.07	9 27 42.8	129.63
6	12 35 23.60	1 24 34.4	141.28	6	14 29 46.61	9 40 38.6	128.96
7	12 37 44.61	1 10 26.2	141.44	7	14 32 12.28	9 53 30.3	128.26
8	12 40 5.67	0 56 17.1	141.58	8	14 34 38.07	10 6 17.7	127.54
9	12 42 26.78	0 42 7.2	141.72	9	14 37 3.99	10 19 0.8	126.82
10	12 44 47.96	0 27 56.5	141.83	10	14 39 30.04	10 31 39.5	126.08
11	12 47 9.19	N. 0 13 45.2	141.93	11	14 41 56.22	10 44 13.7	125.31
12	12 49 30.49	S. 0 0 26.7	142.01	12	14 44 22.53	10 56 43.2	124.53
13	12 51 51.85	0 14 38.9	142.07	13	14 46 48.97	11 9 8.0	123.73
14	12 54 13.28	0 28 51.5	142.11	14	14 49 15.53	11 21 28.0	122.92
15	12 56 34.78	0 43 4.2	142.13	15	14 51 42.22	11 33 43.1	122.10
16	12 58 56.35	0 57 17.0	142.14	16	14 54 9.04	11 45 53.2	121.25
17	13 1 17.99	1 11 29.9	142.13	17	14 56 35.98	11 57 58.1	120.39
18	13 3 39.71	1 25 42.6	142.09	18	14 59 3.05	12 9 57.9	119.52
19	13 6 1.51	1 39 55.0	142.05	19	15 1 30.25	12 21 52.3	118.63
20	13 8 23.38	1 54 7.2	141.99	20	15 3 57.58	12 33 41.4	117.72
21	13 10 45.33	2 8 18.9	141.90	21	15 6 25.03	12 45 25.0	116.80
22	13 13 7.37	2 22 30.0	141.80	22	15 8 52.61	12 57 3.0	115.87
23	13 15 29.49	2 36 40.5	141.68	23	15 11 20.31	13 8 35.4	114.92
24	13 17 51.70	S. 2 50 50.2	141.54	24	15 13 48.13	S. 13 20 2.0	113.95



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 17.</b>				<b>TUESDAY 19.</b>			
0	h m s 15 13 48.13	S. 13 20 2.0	113.95	0	h m s 17 13 48.71	S. 20 12 45.3	54.46
1	15 16 16.08	13 31 22.8	112.97	1	17 16 19.64	20 18 7.8	53.05
2	15 18 44.15	13 42 37.7	111.98	2	17 18 50.53	20 23 21.9	51.63
3	15 21 12.34	13 53 46.5	110.97	3	17 21 21.39	20 28 27.4	50.21
4	15 23 40.65	14 4 49.3	109.95	4	17 23 52.21	20 33 24.4	48.79
5	15 26 9.07	14 15 45.9	108.91	5	17 26 22.99	20 38 12.9	47.37
6	15 28 37.61	14 26 36.2	107.86	6	17 28 53.72	20 42 52.9	45.94
7	15 31 6.27	14 37 20.2	106.80	7	17 31 24.39	20 47 24.2	44.51
8	15 33 35.03	14 47 57.8	105.72	8	17 33 55.01	20 51 47.0	43.09
9	15 36 3.91	14 58 28.9	104.63	9	17 36 25.56	20 56 1.3	41.66
10	15 38 32.90	15 8 53.4	103.53	10	17 38 56.04	21 0 6.9	40.23
11	15 41 2.00	15 19 11.3	102.42	11	17 41 26.45	21 4 4.0	38.80
12	15 43 31.20	15 29 22.4	101.28	12	17 43 56.77	21 7 52.5	37.37
13	15 46 0.50	15 39 26.7	100.14	13	17 46 27.02	21 11 32.4	35.93
14	15 48 29.91	15 49 24.1	98.99	14	17 48 57.18	21 15 3.7	34.51
15	15 50 59.42	15 59 14.6	97.82	15	17 51 27.24	21 18 26.5	33.08
16	15 53 29.02	16 8 58.1	96.66	16	17 53 57.21	21 21 40.7	31.65
17	15 55 58.71	16 18 34.5	95.47	17	17 56 27.07	21 24 46.3	30.22
18	15 58 28.50	16 28 3.7	94.27	18	17 58 56.82	21 27 43.4	28.80
19	16 0 58.38	16 37 25.7	93.07	19	18 1 26.46	21 30 31.9	27.37
20	16 3 28.34	16 46 40.5	91.86	20	18 3 55.99	21 33 11.8	25.94
21	16 5 58.38	16 55 48.0	90.63	21	18 6 25.39	21 35 43.2	24.52
22	16 8 28.51	17 4 48.0	89.38	22	18 8 54.66	21 38 6.1	23.11
23	16 10 58.71	S. 17 13 40.6	88.13	23	18 11 23.80	S. 21 40 20.5	21.69
<b>MONDAY 18.</b>				<b>WEDNESDAY 20.</b>			
0	16 13 28.99	S. 17 22 25.6	86.87	0	18 13 52.80	S. 21 42 26.4	20.28
1	16 15 59.34	17 31 3.1	85.61	1	18 16 21.66	21 44 23.8	18.87
2	16 18 29.76	17 39 32.9	84.33	2	18 18 50.37	21 46 12.8	17.46
3	16 21 0.24	17 47 55.0	83.04	3	18 21 18.93	21 47 53.3	16.05
4	16 23 30.79	17 56 9.4	81.75	4	18 23 47.33	21 49 25.4	14.65
5	16 26 1.39	18 4 16.0	80.45	5	18 26 15.57	21 50 49.1	13.25
6	16 28 32.05	18 12 14.8	79.14	6	18 28 43.65	21 52 4.4	11.86
7	16 31 2.75	18 20 5.7	77.82	7	18 31 11.56	21 53 11.4	10.47
8	16 33 33.51	18 27 48.7	76.50	8	18 33 39.29	21 54 10.1	9.09
9	16 36 4.31	18 35 23.7	75.16	9	18 36 6.85	21 55 0.5	7.71
10	16 38 35.15	18 42 50.6	73.82	10	18 38 34.22	21 55 42.6	6.33
11	16 41 6.02	18 50 9.5	72.47	11	18 41 1.40	21 56 16.5	4.96
12	16 43 36.92	18 57 20.3	71.12	12	18 43 28.39	21 56 42.1	3.59
13	16 46 7.85	19 4 23.0	69.76	13	18 45 55.18	21 56 59.6	2.23
14	16 48 38.81	19 11 17.4	68.39	14	18 48 21.78	21 57 8.9	0.88
15	16 51 9.79	19 18 3.7	67.02	15	18 50 48.17	21 57 10.1	0.47
16	16 53 40.78	19 24 41.7	65.64	16	18 53 14.35	21 57 3.2	1.82
17	16 56 11.78	19 31 11.4	64.26	17	18 55 40.32	21 56 48.3	3.15
18	16 58 42.79	19 37 32.8	62.87	18	18 58 6.07	21 56 25.4	4.48
19	17 1 13.79	19 43 45.9	61.48	19	19 0 31.60	21 55 54.5	5.81
20	17 3 44.80	19 49 50.6	60.08	20	19 2 56.90	21 55 15.6	7.13
21	17 6 15.80	19 55 46.9	58.68	21	19 5 21.98	21 54 28.9	8.44
22	17 8 46.79	20 1 34.8	57.28	22	19 7 46.83	21 53 34.3	9.75
23	17 11 17.76	20 7 14.3	55.87	23	19 10 11.44	21 52 31.9	11.05
24	17 13 48.71	S. 20 12 45.3	54.46	24	19 12 35.81	S. 21 51 21.7	12.34



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 21.</b>				<b>SATURDAY 23.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	19 12 35.81	S. 21 51 21.7	12.34	0	21 2 37.84	S. 18 38 44.6	64.50
1	19 14 59.94	21 50 3.8	13.63	1	21 4 48.02	18 32 15.0	65.36
2	19 17 23.82	21 48 38.2	14.91	2	21 6 57.90	18 25 40.3	66.21
3	19 19 47.46	21 47 4.9	16.18	3	21 9 7.47	18 19 0.5	67.05
4	19 22 10.84	21 45 24.1	17.43	4	21 11 16.74	18 12 15.7	67.89
5	19 24 33.97	21 43 35.7	18.69	5	21 13 25.71	18 5 25.8	68.72
6	19 26 56.84	21 41 39.8	19.94	6	21 15 34.38	17 58 31.1	69.53
7	19 29 19.45	21 39 36.4	21.18	7	21 17 42.75	17 51 31.5	70.34
8	19 31 41.80	21 37 25.6	22.41	8	21 19 50.82	17 44 27.0	71.14
9	19 34 3.88	21 35 7.4	23.64	9	21 21 58.59	17 37 17.8	71.93
10	19 36 25.69	21 32 41.9	24.86	10	21 24 6.06	17 30 3.9	72.70
11	19 38 47.23	21 30 9.1	26.07	11	21 26 13.24	17 22 45.4	73.47
12	19 41 8.50	21 27 29.1	27.27	12	21 28 20.13	17 15 22.3	74.23
13	19 43 29.49	21 24 41.9	28.46	13	21 30 26.72	17 7 54.6	74.98
14	19 45 50.20	21 21 47.6	29.63	14	21 32 33.03	17 0 22.5	75.72
15	19 48 10.63	21 18 46.3	30.81	15	21 34 39.04	16 52 45.9	76.46
16	19 50 30.78	21 15 37.9	31.98	16	21 36 44.77	16 45 5.0	77.19
17	19 52 50.64	21 12 22.5	33.14	17	21 38 50.21	16 37 19.7	77.91
18	19 55 10.21	21 9 0.2	34.28	18	21 40 55.36	16 29 30.1	78.61
19	19 57 29.50	21 5 31.1	35.42	19	21 43 0.23	16 21 36.4	79.31
20	19 59 48.49	21 1 55.1	36.56	20	21 45 4.82	16 13 38.4	80.01
21	20 2 7.19	20 58 12.4	37.68	21	21 47 9.13	16 5 36.3	80.68
22	20 4 25.60	20 54 23.0	38.79	22	21 49 13.16	15 57 30.2	81.35
23	20 6 43.71	S. 20 50 26.9	39.89	23	21 51 16.92	S. 15 49 20.1	82.02
<b>FRIDAY 22.</b>				<b>SUNDAY 24.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	20 9 1.53	S. 20 46 24.2	40.99	0	21 53 20.40	S. 15 41 6.0	82.68
1	20 11 19.05	20 42 15.0	42.08	1	21 55 23.61	15 32 48.0	83.32
2	20 13 36.26	20 37 59.3	43.16	2	21 57 26.55	15 24 26.2	83.96
3	20 15 53.18	20 33 37.1	44.23	3	21 59 29.22	15 16 0.5	84.59
4	20 18 9.79	20 29 8.6	45.28	4	22 1 31.63	15 7 31.1	85.21
5	20 20 26.10	20 24 33.8	46.33	5	22 3 33.77	14 58 58.0	85.82
6	20 22 42.11	20 19 52.7	47.37	6	22 5 35.65	14 50 21.2	86.42
7	20 24 57.81	20 15 5.4	48.40	7	22 7 37.27	14 41 40.9	87.02
8	20 27 13.21	20 10 11.9	49.42	8	22 9 38.63	14 32 57.0	87.61
9	20 29 28.31	20 5 12.3	50.44	9	22 11 39.74	14 24 9.6	88.19
10	20 31 43.09	20 0 6.6	51.44	10	22 13 40.59	14 15 18.7	88.76
11	20 33 57.57	19 54 55.0	52.43	11	22 15 41.20	14 6 24.5	89.32
12	20 36 11.75	19 49 37.5	53.41	12	22 17 41.55	13 57 26.9	89.87
13	20 38 25.62	19 44 14.1	54.39	13	22 19 41.66	13 48 26.0	90.42
14	20 40 39.18	19 38 44.8	55.36	14	22 21 41.53	13 39 21.8	90.97
15	20 42 52.43	19 33 9.8	56.31	15	22 23 41.16	13 30 14.4	91.49
16	20 45 5.37	19 27 29.1	57.26	16	22 25 40.55	13 21 3.9	92.01
17	20 47 18.01	19 21 42.7	58.19	17	22 27 39.70	13 11 50.3	92.52
18	20 49 30.33	19 15 50.8	59.12	18	22 29 38.62	13 2 33.6	93.03
19	20 51 42.35	19 9 53.3	60.04	19	22 31 37.31	12 53 13.9	93.53
20	20 53 54.07	19 3 50.3	60.95	20	22 33 35.78	12 43 51.2	94.02
21	20 56 5.47	18 57 41.9	61.85	21	22 35 34.01	12 34 25.6	94.50
22	20 58 16.57	18 51 28.1	62.74	22	22 37 32.03	12 24 57.2	94.98
23	21 0 27.36	18 45 9.0	63.62	23	22 39 29.82	12 15 25.9	95.45
24	21 2 37.84	S. 18 38 44.6	64.50	24	22 41 27.39	S. 12 5 51.8	95.91



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 25.</b>				<b>WEDNESDAY 27.</b>			
	<i>h m s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>° ' "</i>	<i>"</i>
0	22 41 27.39	S. 12 5 51.8	95.91	0	0 12 11.09	S. 3 46 21.1	109.57
1	22 43 24.75	11 56 15.0	96.36	1	0 14 1.55	3 35 23.3	109.68
2	22 45 21.90	11 46 35.5	96.81	2	0 15 51.93	3 24 24.9	109.79
3	22 47 18.83	11 36 53.3	97.24	3	0 17 42.25	3 13 25.8	109.91
4	22 49 15.56	11 27 8.6	97.67	4	0 19 32.51	3 2 26.0	110.01
5	22 51 12.09	11 17 21.3	98.09	5	0 21 22.70	2 51 25.7	110.10
6	22 53 8.42	11 7 31.5	98.51	6	0 23 12.84	2 40 24.8	110.19
7	22 55 4.55	10 57 39.2	98.92	7	0 25 2.92	2 29 23.4	110.27
8	22 57 0.48	10 47 44.5	99.32	8	0 26 52.95	2 18 21.5	110.35
9	22 58 56.22	10 37 47.4	99.71	9	0 28 42.93	2 7 19.2	110.42
10	23 0 51.77	10 27 48.0	100.08	10	0 30 32.86	1 56 16.5	110.48
11	23 2 47.13	10 17 46.4	100.46	11	0 32 22.75	1 45 13.5	110.53
12	23 4 42.31	10 7 42.5	100.83	12	0 34 12.60	1 34 10.2	110.58
13	23 6 37.31	9 57 36.4	101.20	13	0 36 2.41	1 23 6.6	110.62
14	23 8 32.13	9 47 28.1	101.56	14	0 37 52.19	1 12 2.7	110.66
15	23 10 26.77	9 37 17.7	101.90	15	0 39 41.94	1 0 58.7	110.68
16	23 12 21.24	9 27 5.3	102.24	16	0 41 31.66	0 49 54.5	110.71
17	23 14 15.55	9 16 50.8	102.58	17	0 43 21.36	0 38 50.1	110.73
18	23 16 9.68	9 6 34.3	102.91	18	0 45 11.03	0 27 45.7	110.74
19	23 18 3.65	8 56 15.9	103.23	19	0 47 0.68	0 16 41.2	110.75
20	23 19 57.47	8 45 55.5	103.55	20	0 48 50.32	S. 0 5 36.7	110.75
21	23 21 51.12	8 35 33.3	103.85	21	0 50 39.94	N. 0 5 27.8	110.74
22	23 23 44.62	8 25 9.3	104.14	22	0 52 29.56	0 16 32.2	110.72
23	23 25 37.97	S. 8 14 43.6	104.43	23	0 54 19.16	N. 0 27 36.5	110.70
<b>TUESDAY 26.</b>				<b>THURSDAY 28.</b>			
	<i>h m s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>° ' "</i>	<i>"</i>
0	23 27 31.17	S. 8 4 16.1	104.72	0	0 56 8.76	N. 0 38 40.6	110.68
1	23 29 24.22	7 53 46.9	105.00	1	0 57 58.36	0 49 44.6	110.64
2	23 31 17.13	7 43 16.1	105.27	2	0 59 47.96	1 0 48.3	110.60
3	23 33 9.90	7 32 43.6	105.54	3	1 1 37.56	1 11 51.8	110.56
4	23 35 2.53	7 22 9.6	105.80	4	1 3 27.16	1 22 55.0	110.51
5	23 36 55.03	7 11 34.0	106.06	5	1 5 16.78	1 33 57.9	110.45
6	23 38 47.40	7 0 56.9	106.30	6	1 7 6.41	1 45 0.4	110.38
7	23 40 39.64	6 50 18.4	106.53	7	1 8 56.06	1 56 2.5	110.31
8	23 42 31.76	6 39 38.5	106.77	8	1 10 45.73	2 7 4.1	110.23
9	23 44 23.75	6 28 57.2	106.99	9	1 12 35.42	2 18 5.2	110.14
10	23 46 15.62	6 18 14.6	107.21	10	1 14 25.13	2 29 5.8	110.06
11	23 48 7.38	6 7 30.7	107.42	11	1 16 14.87	2 40 5.9	109.97
12	23 49 59.02	5 56 45.6	107.62	12	1 18 4.64	2 51 5.4	109.86
13	23 51 50.56	5 45 59.3	107.82	13	1 19 54.44	3 2 4.2	109.74
14	23 53 41.99	5 35 11.8	108.02	14	1 21 44.28	3 13 2.3	109.63
15	23 55 33.31	5 24 23.1	108.20	15	1 23 34.16	3 23 59.7	109.51
16	23 57 24.54	5 13 33.4	108.38	16	1 25 24.07	3 34 56.4	109.38
17	23 59 15.67	5 2 42.6	108.55	17	1 27 14.03	3 45 52.2	109.24
18	0 1 6.70	4 51 50.8	108.71	18	1 29 4.04	3 56 47.2	109.10
19	0 2 57.65	4 40 58.1	108.87	19	1 30 54.09	4 7 41.4	108.96
20	0 4 48.50	4 30 4.4	109.02	20	1 32 44.20	4 18 34.7	108.80
21	0 6 39.27	4 19 9.8	109.17	21	1 34 34.36	4 29 27.0	108.63
22	0 8 29.96	4 8 14.4	109.31	22	1 36 24.58	4 40 18.3	108.46
23	0 10 20.56	3 57 18.1	109.44	23	1 38 14.85	4 51 8.5	108.28
24	0 12 11.09	S. 3 46 21.1	109.57	24	1 40 5.19	N. 5 1 57.7	108.11



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 29.</b>				<b>SATURDAY 30.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	1 40 5 <sup>19</sup>	N. 5 1 57 <sup>7</sup>	108 <sup>11</sup>	0	2 24 38 <sup>97</sup>	N. 9 14 34 <sup>2</sup>	101 <sup>75</sup>
1	1 41 55 <sup>60</sup>	5 12 45 <sup>8</sup>	107 <sup>92</sup>	1	2 26 31 <sup>72</sup>	9 24 43 <sup>7</sup>	101 <sup>40</sup>
2	1 43 46 <sup>07</sup>	5 23 32 <sup>7</sup>	107 <sup>72</sup>	2	2 28 24 <sup>59</sup>	9 34 51 <sup>0</sup>	101 <sup>04</sup>
3	1 45 36 <sup>62</sup>	5 34 18 <sup>5</sup>	107 <sup>52</sup>	3	2 30 17 <sup>59</sup>	9 44 56 <sup>2</sup>	100 <sup>68</sup>
4	1 47 27 <sup>24</sup>	5 45 3 <sup>0</sup>	107 <sup>32</sup>	4	2 32 10 <sup>72</sup>	9 54 59 <sup>2</sup>	100 <sup>32</sup>
5	1 49 17 <sup>93</sup>	5 55 46 <sup>3</sup>	107 <sup>10</sup>	5	2 34 3 <sup>99</sup>	10 5 0 <sup>0</sup>	99 <sup>94</sup>
6	1 51 8 <sup>70</sup>	6 6 28 <sup>2</sup>	106 <sup>88</sup>	6	2 35 57 <sup>40</sup>	10 14 58 <sup>5</sup>	99 <sup>55</sup>
7	1 52 59 <sup>56</sup>	6 17 8 <sup>8</sup>	106 <sup>66</sup>	7	2 37 50 <sup>94</sup>	10 24 54 <sup>6</sup>	99 <sup>15</sup>
8	1 54 50 <sup>50</sup>	6 27 48 <sup>1</sup>	106 <sup>43</sup>	8	2 39 44 <sup>62</sup>	10 34 48 <sup>3</sup>	98 <sup>76</sup>
9	1 56 41 <sup>52</sup>	6 38 25 <sup>9</sup>	106 <sup>18</sup>	9	2 41 38 <sup>45</sup>	10 44 39 <sup>7</sup>	98 <sup>36</sup>
10	1 58 32 <sup>64</sup>	6 49 2 <sup>2</sup>	105 <sup>93</sup>	10	2 43 32 <sup>42</sup>	10 54 28 <sup>6</sup>	97 <sup>94</sup>
11	2 0 23 <sup>84</sup>	6 59 37 <sup>0</sup>	105 <sup>68</sup>	11	2 45 26 <sup>54</sup>	11 4 15 <sup>0</sup>	97 <sup>52</sup>
12	2 2 15 <sup>14</sup>	7 10 10 <sup>3</sup>	105 <sup>42</sup>	12	2 47 20 <sup>81</sup>	11 13 58 <sup>9</sup>	97 <sup>10</sup>
13	2 4 6 <sup>54</sup>	7 20 42 <sup>0</sup>	105 <sup>15</sup>	13	2 49 15 <sup>23</sup>	11 23 40 <sup>2</sup>	96 <sup>66</sup>
14	2 5 58 <sup>03</sup>	7 31 12 <sup>1</sup>	104 <sup>87</sup>	14	2 51 9 <sup>80</sup>	11 33 18 <sup>8</sup>	96 <sup>22</sup>
15	2 7 49 <sup>63</sup>	7 41 40 <sup>5</sup>	104 <sup>59</sup>	15	2 53 4 <sup>53</sup>	11 42 54 <sup>8</sup>	95 <sup>77</sup>
16	2 9 41 <sup>33</sup>	7 52 7 <sup>2</sup>	104 <sup>30</sup>	16	2 54 59 <sup>42</sup>	11 52 28 <sup>1</sup>	95 <sup>32</sup>
17	2 11 33 <sup>14</sup>	8 2 32 <sup>1</sup>	104 <sup>00</sup>	17	2 56 54 <sup>46</sup>	12 1 58 <sup>6</sup>	94 <sup>85</sup>
18	2 13 25 <sup>05</sup>	8 12 55 <sup>2</sup>	103 <sup>71</sup>	18	2 58 49 <sup>67</sup>	12 11 26 <sup>3</sup>	94 <sup>38</sup>
19	2 15 17 <sup>08</sup>	8 23 16 <sup>6</sup>	103 <sup>40</sup>	19	3 0 45 <sup>03</sup>	12 20 51 <sup>2</sup>	93 <sup>91</sup>
20	2 17 9 <sup>22</sup>	8 33 36 <sup>0</sup>	103 <sup>08</sup>	20	3 2 40 <sup>56</sup>	12 30 13 <sup>2</sup>	93 <sup>43</sup>
21	2 19 1 <sup>48</sup>	8 43 53 <sup>5</sup>	102 <sup>76</sup>	21	3 4 36 <sup>26</sup>	12 39 32 <sup>3</sup>	92 <sup>93</sup>
22	2 20 53 <sup>85</sup>	8 54 9 <sup>1</sup>	102 <sup>43</sup>	22	3 6 32 <sup>13</sup>	12 48 48 <sup>4</sup>	92 <sup>43</sup>
23	2 22 46 <sup>35</sup>	9 4 22 <sup>7</sup>	102 <sup>09</sup>	23	3 8 28 <sup>17</sup>	12 58 1 <sup>5</sup>	91 <sup>93</sup>
24	2 24 38 <sup>97</sup>	N. 9 14 34 <sup>2</sup>	101 <sup>75</sup>	24	3 10 24 <sup>37</sup>	N. 13 7 11 <sup>6</sup>	91 <sup>42</sup>

## PHASES OF THE MOON.

Apr. 8	☾	First Quarter	- - - - -	<sup>h</sup> <sup>m</sup> 16 25 <sup>5</sup>
15	☉	Full Moon	- - - - -	10 26 <sup>0</sup>
22	☾	Last Quarter	- - - - -	4 25 <sup>0</sup>
30	●	New Moon	- - - - -	6 37 <sup>2</sup>

Apr. 1	☾	Apogee	- - - - -	<sup>h</sup> 21
15	☾	Perigee	- - - - -	11
29	☾	Apogee	- - - - -	0



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
3	SUN W.	26 43 46	3526	28 3 41	3520	29 23 43	3512	30 43 54	3504
	Aldebaran E.	28 0 36	3083	26 32 6	3083	25 3 36	3083	23 35 5	3083
	Pollux E.	72 21 30	3109	70 53 31	3107	69 25 30	3106	67 57 28	3105
	Regulus E.	108 8 58	3077	106 40 20	3075	105 11 40	3073	103 42 57	3072
4	SUN W.	37 26 43	3472	38 47 38	3466	40 8 40	3460	41 29 49	3454
	Pollux E.	60 36 51	3096	59 8 37	3093	57 40 19	3091	56 11 59	3089
	Regulus E.	96 18 42	3057	94 49 40	3053	93 20 33	3050	91 51 22	3046
5	SUN W.	48 17 28	3418	49 39 24	3410	51 1 29	3401	52 23 44	3394
	Pollux E.	84 49 27	3073	82 20 45	3070	81 24 16	3068	79 54 12	3064
	Regulus E.	124 24 0	3020	122 54 12	3014	121 24 16	3007	119 54 12	3001
6	SUN W.	59 17 24	3348	60 40 40	3337	62 4 9	3327	63 27 49	3315
	Jupiter W.	23 15 29	3090	24 43 51	3076	26 12 30	3061	27 41 27	3047
	Pollux E.	36 58 2	3050	35 28 51	3048	33 59 37	3046	32 30 22	3046
	Regulus E.	72 21 39	2962	70 50 39	2953	69 19 27	2944	67 48 4	2935
	Spica E.	126 5 6	3008	124 35 3	2997	123 4 47	2986	121 34 17	2975
7	SUN W.	70 29 32	3255	71 54 36	3242	73 19 55	3229	74 45 30	3215
	Jupiter W.	35 10 29	2979	36 41 8	2965	38 12 4	2950	39 43 19	2937
	Aldebaran W.	20 11 7	2894	21 43 34	2880	23 16 19	2866	24 49 21	2852
	Pollux E.	25 4 34	3069	23 35 47	3083	22 7 16	3102	20 39 9	3128
	Regulus E.	60 7 57	2882	58 35 15	2870	57 2 17	2858	55 29 4	2845
8	SUN W.	81 57 42	3140	83 25 3	3124	84 52 43	3108	86 20 43	3091
	Jupiter W.	47 24 5	2863	48 57 12	2847	50 30 39	2831	52 4 26	2814
	Aldebaran W.	32 39 10	2779	34 14 6	2764	35 49 21	2749	37 24 56	2732
	Regulus E.	47 38 50	2779	46 3 54	2764	44 28 39	2750	42 53 6	2735
	Spica E.	101 34 27	2806	100 0 7	2791	98 25 28	2776	96 50 28	2761
9	SUN W.	93 45 56	3004	95 16 4	2986	96 46 35	2968	98 17 28	2948
	Jupiter W.	59 58 46	2731	61 34 45	2713	63 11 8	2695	64 47 54	2677
	Aldebaran W.	45 28 14	2650	47 6 1	2634	48 44 10	2616	50 22 44	2599
	Regulus E.	34 50 16	2658	33 12 40	2642	31 34 42	2626	29 56 22	2610
	Spica E.	88 50 19	2680	87 13 12	2663	85 35 42	2646	83 57 49	2629
10	SUN W.	105 57 58	2853	107 31 17	2833	109 5 2	2813	110 39 13	2794
	Jupiter W.	72 57 53	2585	74 37 8	2566	76 16 50	2548	77 56 57	2529
	Aldebaran W.	58 41 36	2507	60 22 39	2489	62 4 7	2471	63 46 1	2453
	Pollux W.	15 56 3	2922	17 27 54	2832	19 1 40	2759	20 37 1	2698
	Spica E.	75 42 29	2540	74 2 12	2523	72 21 31	2505	70 40 25	2487
11	SUN W.	118 36 30	2697	120 13 14	2677	121 50 25	2659	123 28 0	2640
	Jupiter W.	86 24 9	2434	88 6 55	2415	89 50 8	2397	91 33 47	2378
	Aldebaran W.	72 22 7	2360	74 6 40	2341	75 51 40	2322	77 37 7	2304
	Pollux W.	28 51 6	2489	30 32 35	2457	32 14 49	2427	33 57 45	2400
	Spica E.	62 8 42	2400	60 25 8	2383	58 41 9	2366	56 56 46	2350
12	Antares E.	108 2 39	2405	106 19 12	2386	104 35 17	2367	102 50 55	2348
	Jupiter W.	100 18 38	2289	102 4 53	2272	103 51 33	2255	105 38 38	2239
	Aldebaran W.	86 30 56	2216	88 18 59	2199	90 7 28	2182	91 56 22	2167



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
3	Sun W.	32 4 14	3498	33 24 40	3491	34 45 14	3485	36 5 55	3479
	Aldebaran E.	22 6 34	3082	20 38 2	3082	19 9 31	3082	17 40 59	3083
	Pollux E.	66 29 24	3104	65 1 19	3102	63 33 12	3100	62 5 3	3098
	Regulus E.	102 14 13	3069	100 45 25	3066	99 16 34	3064	97 47 40	3061
4	Sun W.	42 51 5	3447	44 12 29	3439	45 34 1	3433	46 55 40	3425
	Pollux E.	54 43 36	3086	53 15 9	3083	51 46 39	3080	50 18 5	3077
	Regulus E.	90 22 6	3040	88 52 43	3036	87 23 15	3031	85 53 41	3026
5	Sun W.	53 46 7	3385	55 8 41	3376	56 31 25	3367	57 54 19	3358
	Pollux E.	42 54 16	3060	41 25 18	3057	39 56 16	3055	38 27 11	3052
	Regulus E.	78 24 0	2993	76 53 39	2986	75 23 9	2978	73 52 29	2970
6	Sun W.	64 51 43	3304	66 15 50	3293	67 40 10	3281	69 4 44	3269
	Jupiter W.	29 10 42	3034	30 40 13	3020	32 10 1	3006	33 40 6	2992
	Pollux E.	31 1 6	3047	29 31 52	3049	28 2 40	3053	26 33 33	3059
	Regulus E.	66 16 29	2924	64 44 41	2914	63 12 40	2904	61 40 26	2892
	Spica E.	120 3 33	2964	118 32 35	2953	117 1 23	2940	115 29 55	2928
7	Sun W.	76 11 22	3201	77 37 30	3186	79 3 56	3171	80 30 40	3156
	Jupiter W.	41 14 51	2923	42 46 41	2908	44 18 50	2893	45 51 18	2878
	Aldebaran W.	26 22 42	2838	27 56 21	2823	29 30 19	2809	31 4 35	2795
	Pollux E.	19 11 33	3164	17 44 41	3144	16 18 48	3124	14 54 17	3104
	Regulus E.	53 55 35	2832	52 21 49	2820	50 47 47	2806	49 13 27	2793
8	Sun W.	87 49 3	3074	89 17 44	3057	90 46 46	3039	92 16 10	3022
	Jupiter W.	53 38 35	2798	55 13 5	2782	56 47 56	2765	58 23 10	2748
	Aldebaran W.	39 0 53	2717	40 37 10	2700	42 13 50	2684	43 50 51	2668
	Regulus E.	41 17 13	2720	39 40 59	2705	38 4 26	2689	36 27 31	2674
	Spica E.	95 15 9	2745	93 39 29	2729	92 3 27	2713	90 27 4	2696
9	Sun W.	99 48 46	2930	101 20 27	2910	102 52 33	2891	104 25 3	2872
	Jupiter W.	66 25 5	2660	68 2 39	2641	69 40 39	2623	71 19 3	2604
	Aldebaran W.	52 1 41	2580	53 41 3	2563	55 20 49	2545	57 1 0	2527
	Regulus E.	28 17 41	2594	26 38 38	2579	24 59 14	2563	23 19 28	2548
	Spica E.	82 19 33	2611	80 40 53	2593	79 1 49	2576	77 22 21	2558
10	Sun W.	112 13 49	2775	113 48 50	2754	115 24 18	2735	117 0 11	2716
	Jupiter W.	79 37 30	2510	81 18 30	2491	82 59 56	2472	84 41 49	2453
	Aldebaran W.	65 28 21	2434	67 11 7	2415	68 54 21	2397	70 38 0	2378
	Pollux W.	22 13 43	2645	23 51 36	2599	25 30 32	2559	27 10 23	2522
	Spica E.	68 58 54	2470	67 16 58	2453	65 34 38	2434	63 51 52	2417
	Antares E.	114 51 47	2485	113 10 12	2465	111 28 9	2445	109 45 38	2425
11	Sun W.	125 6 1	2621	126 44 27	2603	128 23 18	2586	130 2 32	2569
	Jupiter W.	93 17 53	2360	95 2 26	2342	96 47 24	2324	98 32 48	2306
	Aldebaran W.	79 23 0	2286	81 9 20	2268	82 56 6	2251	84 43 18	2233
	Pollux W.	35 41 20	2374	37 25 32	2349	39 10 21	2326	40 55 43	2302
	Spica E.	55 12 0	2334	53 26 50	2319	51 41 18	2304	49 55 24	2289
	Antares E.	101 6 6	2330	99 20 50	2311	97 35 7	2293	95 48 58	2275
12	Jupiter W.	107 26 7	2224	109 13 59	2208	111 2 14	2194	112 50 51	2180
	Aldebaran W.	93 45 39	2151	95 35 21	2136	97 25 25	2121	99 15 53	2107



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12	Pollux W.	42 41 39	2280	44 28 8	2260	46 15 7	2239	48 2 36	2220
	Spica E.	48 9 9	2275	46 22 33	2263	44 35 39	2250	42 48 26	2239
	Antares E.	94 2 22	2258	92 15 21	2241	90 27 55	2225	88 40 5	2208
	Saturn E.	114 14 39	2212	112 26 29	2195	110 37 54	2178	108 48 54	2162
13	Jupiter W.	114 39 49	2165	116 29 9	2152	118 18 48	2140	120 8 47	2128
	Aldebaran W.	101 6 42	2093	102 57 53	2080	104 49 23	2066	106 41 14	2054
	Pollux W.	57 6 54	2134	58 57 1	2119	60 47 31	2106	62 38 24	2091
	Regulus W.	21 1 51	2116	22 52 26	2100	24 43 26	2084	26 34 50	2069
	Spica E.	33 48 52	2205	32 0 31	2203	30 12 8	2205	28 23 48	2212
	Antares E.	79 35 5	2136	77 45 1	2124	75 54 38	2111	74 3 56	2100
	Saturn E.	99 37 59	2088	97 46 41	2074	95 55 2	2062	94 3 4	2049
	α Aquilæ E.	122 31 48	2091	121 1 24	2044	119 30 1	2000	117 57 42	2059
14	Pollux W.	71 57 35	2034	73 50 16	2026	75 43 10	2018	77 36 17	2010
	Regulus W.	35 57 0	2010	37 50 18	2001	39 43 50	1993	41 37 35	1986
	Antares E.	64 46 29	2055	62 54 20	2049	61 2 2	2043	59 9 35	2039
	Saturn E.	84 38 44	1998	82 45 6	1989	80 51 14	1982	78 57 11	1975
	α Aquilæ E.	110 4 16	2701	108 27 37	2677	106 50 27	2656	105 12 48	2637
15	Pollux W.	87 4 17	1987	88 58 12	1984	90 52 11	1983	92 46 12	1983
	Regulus W.	51 8 49	1962	53 3 24	1959	54 58 3	1957	56 52 45	1957
	Antares E.	49 46 10	2033	47 53 28	2036	46 0 50	2041	44 8 19	2047
	Saturn E.	69 24 37	1952	67 29 47	1950	65 34 54	1949	63 39 59	1948
	α Aquilæ E.	96 59 14	2577	95 19 47	2571	93 40 12	2567	92 0 32	2565
16	Pollux W.	102 15 55	1995	104 9 38	2000	106 3 13	2005	107 56 39	2012
	Regulus W.	66 25 59	1967	68 20 26	1971	70 14 47	1976	72 8 59	1982
	Spica W.	14 11 13	2514	15 52 6	2403	17 35 36	2325	19 20 59	2270
	Antares E.	34 48 57	2106	32 58 7	2126	31 7 47	2150	29 18 3	2178
	Saturn E.	54 5 39	1959	52 11 0	1963	50 16 27	1968	48 22 2	1974
	α Aquilæ E.	83 42 30	2587	82 3 17	2597	80 24 18	2609	78 45 36	2624
	Fomalhaut E.	117 29 48	2237	115 42 16	2232	113 54 36	2230	112 6 53	2229
	Venus E.	126 55 46	2225	125 7 56	2229	123 20 11	2233	121 32 33	2239
17	Regulus W.	81 37 17	2023	83 30 16	2033	85 22 59	2044	87 15 25	2056
	Spica W.	28 21 55	2160	30 11 23	2156	32 0 57	2154	33 50 34	2155
	Saturn E.	38 52 45	2015	36 59 34	2026	35 6 40	2037	33 14 3	2048
	α Aquilæ E.	70 38 4	2731	69 2 5	2760	67 26 45	2791	65 52 5	2826
	Fomalhaut E.	103 8 41	2246	101 21 22	2253	99 34 14	2262	97 47 18	2272
	Venus E.	112 36 59	2281	110 50 32	2292	109 4 20	2304	107 18 26	2315
	α Pegasi E.	118 11 35	2514	116 30 41	2509	114 49 40	2505	113 8 34	2504
18	Regulus W.	96 32 46	2122	98 23 11	2137	100 13 14	2153	102 2 53	2168
	Spica W.	42 57 15	2188	44 46 1	2198	46 34 32	2210	48 22 44	2222
	α Aquilæ E.	58 11 7	3044	56 41 49	3100	55 13 39	3159	53 46 41	3224
	Fomalhaut E.	88 56 42	2335	87 11 33	2350	85 26 46	2366	83 42 23	2384
	Venus E.	98 33 40	2387	96 49 46	2403	95 6 16	2419	93 23 8	2436
	α Pegasi E.	104 43 33	2525	103 2 55	2534	101 22 29	2545	99 42 18	2556
19	Spica W.	57 18 52	2294	59 5 0	2310	60 50 45	2326	62 36 6	2343
	Antares W.	13 24 8	3133	14 51 38	2964	16 22 36	2848	17 56 2	2768
	α Aquilæ E.	46 52 55	3640	45 35 4	3747	44 19 7	3864	43 5 11	3993



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		° ' "		° ' "		° ' "		° ' "	
12	Pollux W.	49 50 33	2201	51 38 59	2183	53 27 52	2166	55 17 10	2149
	Spica E.	41 0 57	2229	39 13 13	2220	37 25 16	2213	35 37 8	2208
	Antares E.	86 51 50	2193	85 3 12	2178	83 14 12	2163	81 24 49	2149
	Saturn E.	106 59 29	2147	105 9 41	2131	103 19 29	2116	101 28 55	2102
13	Jupiter W.	121 59 3	2117	123 49 37	2106	125 40 27	2096	127 31 33	2087
	Aldebaran W.	108 33 24	2043	110 25 51	2032	112 18 35	2021	114 11 36	2012
	Pollux W.	64 29 37	2078	66 21 10	2066	68 13 1	2055	70 5 10	2044
	Regulus W.	28 26 37	2055	30 18 45	2043	32 11 12	2031	34 3 58	2021
	Spica E.	26 35 38	2222	24 47 43	2238	23 0 13	2263	21 13 19	2299
	Antares E.	72 12 57	2089	70 21 41	2080	68 30 11	2070	66 38 26	2062
	Saturn E.	92 10 46	2037	90 18 10	2027	88 25 18	2016	86 32 9	2006
	α Aquilæ E.	116 24 31	2121	114 50 31	2178	113 15 46	2156	111 40 20	2127
14	Pollux W.	79 29 36	2004	81 23 4	1998	83 16 41	1993	85 10 26	1989
	Regulus W.	43 31 32	1979	45 25 39	1973	47 19 55	1968	49 14 19	1965
	Antares E.	57 17 1	2035	55 24 22	2033	53 31 39	2032	51 38 55	2032
	Saturn E.	77 2 57	1969	75 8 33	1963	73 14 1	1959	71 19 22	1955
	α Aquilæ E.	103 34 44	2621	101 56 18	2606	100 17 32	2594	98 38 29	2585
15	Pollux W.	94 40 13	1984	96 34 13	1985	98 28 11	1987	100 22 6	1991
	Regulus W.	58 47 27	1957	60 42 9	1958	62 36 49	1960	64 31 26	1963
	Antares E.	42 15 57	2054	40 23 47	2063	38 31 51	2075	36 40 13	2089
	Saturn E.	61 45 3	1949	59 50 8	1950	57 55 15	1952	56 0 25	1955
	α Aquilæ E.	90 20 49	2566	88 41 7	2568	87 1 28	2572	85 21 55	2578
16	Pollux W.	109 49 54	2020	111 42 57	2028	113 35 47	2037	115 28 23	2048
	Regulus W.	74 3 2	1988	75 56 55	1996	77 50 35	2004	79 44 3	2013
	Spica W.	21 7 42	2231	22 55 24	2203	24 43 47	2183	26 32 41	2169
	Antares E.	27 29 2	2212	25 40 53	2253	23 53 44	2304	22 7 50	2366
	Saturn E.	46 27 47	1981	44 33 42	1989	42 39 50	1997	40 46 10	2006
	α Aquilæ E.	77 7 14	2641	75 29 15	2660	73 51 42	2681	72 14 37	2705
	Fomalhaut E.	110 19 8	2230	108 31 25	2232	106 43 45	2235	104 56 9	2240
	Venus E.	119 45 4	2246	117 57 45	2254	116 10 37	2262	114 23 41	2271
17	Regulus W.	89 7 32	2068	90 59 21	2081	92 50 50	2094	94 41 59	2108
	Spica W.	35 40 10	2158	37 29 40	2163	39 19 3	2170	41 8 15	2179
	Saturn E.	31 21 44	2060	29 29 44	2073	27 38 4	2087	25 46 45	2102
	α Aquilæ E.	64 18 11	2863	62 45 4	2902	61 12 48	2946	59 41 28	2993
	Fomalhaut E.	96 0 37	2282	94 14 11	2293	92 28 2	2306	90 42 12	2320
	Venus E.	105 32 49	2328	103 47 31	2342	102 2 33	2357	100 17 56	2371
	α Pegasi E.	111 27 27	2505	109 46 20	2508	108 5 18	2512	106 24 21	2518
18	Regulus W.	103 52 8	2184	105 41 0	2201	107 29 26	2218	109 17 27	2235
	Spica W.	50 10 39	2235	51 58 14	2249	53 45 28	2264	55 32 21	2279
	α Aquilæ E.	52 21 0	3294	50 56 42	3370	49 33 51	3452	48 12 33	3522
	Fomalhaut E.	81 58 25	2402	80 14 53	2421	78 31 48	2440	76 49 11	2460
	Venus E.	91 40 25	2454	89 58 7	2471	88 16 13	2490	86 34 46	2508
	α Pegasi E.	98 2 23	2569	96 22 45	2583	94 43 26	2597	93 4 27	2613
19	Spica W.	64 21 3	2360	66 5 35	2377	67 49 42	2395	69 33 24	2412
	Antares W.	19 31 12	2712	21 7 36	2672	22 44 54	2645	24 22 47	2627
	α Aquilæ E.	41 53 24	4135	40 43 56	4291	39 36 55	4465	38 32 32	4658



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19	Fomalhaut E.	75 7 2	2482	73 25 24	2504	71 44 16	2527	70 3 40	2550
	Venus E.	84 53 44	2527	83 13 8	2546	81 32 59	2566	79 53 17	2585
	α Pegasi E.	91 25 50	2630	89 47 36	2648	88 9 46	2666	86 32 20	2686
	SUN E.	129 59 17	2585	128 20 1	2602	126 41 8	2619	125 2 39	2638
20	Spica W.	71 16 41	2430	72 59 33	2448	74 41 59	2466	76 24 0	2484
	Antares W.	26 1 5	2617	27 39 37	2611	29 18 17	2610	30 56 59	2611
	Fomalhaut E.	61 49 5	2680	60 11 59	2708	58 35 30	2738	56 59 40	2769
	Venus E.	71 41 35	2687	70 4 37	2707	68 28 6	2727	66 52 2	2748
	α Pegasi E.	78 32 7	2795	76 57 33	2820	75 23 31	2845	73 50 2	2870
	SUN E.	116 56 34	2733	115 20 38	2753	113 45 8	2772	112 10 3	2791
21	Spica W.	84 47 45	2575	86 27 15	2593	88 6 20	2610	89 45 2	2628
	Antares W.	39 8 58	2649	40 46 47	2659	42 24 22	2671	44 1 41	2683
	Saturn W.	18 26 13	2538	20 6 34	2555	21 46 31	2572	23 26 4	2589
	Fomalhaut E.	49 11 8	2942	47 39 43	2982	46 9 8	3024	44 39 25	3069
	Venus E.	58 58 29	2850	57 25 6	2870	55 52 9	2891	54 19 38	2911
	α Pegasi E.	66 11 9	3012	64 41 11	3043	63 11 52	3076	61 43 13	3109
	SUN E.	104 21 0	2888	102 48 26	2908	101 16 17	2926	99 44 31	2946
22	Spica W.	97 52 36	2713	99 28 58	2729	101 4 59	2746	102 40 38	2762
	Antares W.	52 4 3	2748	53 39 39	2762	55 14 57	2775	56 49 58	2788
	Saturn W.	31 38 4	2672	33 15 21	2688	34 52 17	2704	36 28 51	2720
	Fomalhaut E.	37 25 41	3345	36 2 22	3415	34 40 22	3492	33 19 49	3577
	Venus E.	46 43 19	3008	45 13 16	3027	43 43 36	3047	42 14 21	3065
	α Pegasi E.	54 30 35	3298	53 6 21	3341	51 42 57	3386	50 20 24	3434
	SUN E.	92 11 35	3036	90 42 7	3054	89 13 1	3071	87 44 16	3088
23	Spica W.	110 33 44	2838	112 7 22	2853	113 40 41	2866	115 13 43	2881
	Antares W.	64 40 45	2853	66 14 4	2865	67 47 8	2877	69 19 56	2890
	Saturn W.	44 26 46	2792	46 1 25	2805	47 35 46	2819	49 9 49	2831
	Venus E.	34 53 42	3156	33 26 40	3175	32 0 1	3193	30 33 43	3212
	α Pegasi E.	43 42 11	3723	42 25 48	3794	41 10 40	3871	39 56 51	3955
	SUN E.	80 25 31	3167	78 58 42	3183	77 32 12	3197	76 5 59	3211
24	Antares W.	77 0 14	2945	78 31 36	2954	80 2 46	2965	81 33 42	2974
	Saturn W.	56 56 10	2890	58 28 41	2901	60 0 59	2911	61 33 4	2920
	SUN E.	68 58 57	3276	67 34 18	3288	66 9 53	3300	64 45 42	3312
25	Antares W.	89 5 32	3018	90 35 22	3026	92 5 2	3034	93 34 33	3042
	Saturn W.	69 10 30	2965	70 41 27	2973	72 12 14	2981	73 42 51	2987
	α Aquilæ W.	48 34 56	4202	49 43 20	4156	50 52 28	4113	52 2 17	4075
	SUN E.	57 47 52	3363	56 24 53	3372	55 2 4	3381	53 39 26	3389
26	Antares W.	100 59 59	3074	102 28 41	3079	103 57 16	3084	105 25 45	3090
	Saturn W.	81 13 56	3017	82 43 47	3023	84 13 31	3027	85 43 10	3032
	α Aquilæ W.	57 59 43	3928	59 12 35	3906	60 25 49	3885	61 39 24	3866
	SUN E.	46 48 33	3228	45 26 48	3235	44 5 11	3242	42 43 42	3248
27	Saturn W.	93 10 8	3050	94 39 19	3052	96 8 27	3055	97 37 32	3058
	α Aquilæ W.	67 51 41	3792	69 6 52	3781	70 22 14	3770	71 37 48	3761
	Fomalhaut W.	32 48 51	3870	34 2 41	3813	35 17 30	3762	36 33 12	3717
	SUN E.	35 58 3	3480	34 37 16	3487	33 16 37	3492	31 56 4	3499



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19	Fomalhaut E.	68 23 36	2574	66 44 6	2599	65 5 10	2625	63 26 49	2652
	Venus E.	78 14 2	2606	76 35 15	2625	74 56 54	2646	73 19 1	2666
	α Pegasi E.	84 55 22	2706	83 18 50	2727	81 42 46	2750	80 7 12	2772
	SUN E.	123 24 35	2657	121 46 57	2675	120 9 44	2694	118 32 56	2713
20	Spica W.	78 5 35	2502	79 46 45	2520	81 27 30	2538	83 7 50	2556
	Antares W.	32 35 39	2615	34 14 14	2621	35 52 40	2629	37 30 55	2638
	Fomalhaut E.	55 24 32	2800	53 50 4	2834	52 16 20	2869	50 43 21	2905
	Venus E.	65 16 26	2769	63 41 17	2789	62 6 34	2809	60 32 18	2830
	α Pegasi E.	72 17 5	2897	70 44 43	2925	69 12 55	2953	67 41 44	2982
	SUN E.	110 35 24	2811	109 1 10	2830	107 27 21	2850	105 53 58	2869
21	Spica W.	91 23 19	2645	93 1 13	2663	94 38 43	2679	96 15 51	2696
	Antares W.	45 38 43	2695	47 15 29	2708	48 51 58	2722	50 28 9	2735
	Saturn W.	25 5 14	2606	26 44 1	2623	28 22 24	2640	30 0 25	2656
	Fomalhaut E.	43 10 37	3117	41 42 48	3167	40 15 59	3221	38 50 15	3281
	Venus E.	52 47 33	2930	51 15 52	2950	49 44 37	2969	48 13 45	2989
	α Pegasi E.	60 15 15	3144	58 47 59	3180	57 21 26	3217	55 55 37	3257
	SUN E.	98 13 10	2964	96 42 12	2982	95 11 37	3001	93 41 25	3018
22	Spica W.	104 15 56	2778	105 50 53	2793	107 25 30	2808	108 59 47	2824
	Antares W.	58 24 41	2801	59 59 8	2815	61 33 17	2828	63 7 9	2840
	Saturn W.	38 5 5	2735	39 40 59	2749	41 16 34	2764	42 51 49	2778
	Fomalhaut E.	32 0 50	3672	30 43 33	3780	29 28 10	3902	28 14 52	4041
	Venus E.	40 45 28	3083	39 16 58	3101	37 48 50	3120	36 21 5	3138
	α Pegasi E.	48 58 46	3485	47 38 5	3538	46 18 23	3596	44 59 44	3657
	SUN E.	86 15 52	3104	84 47 47	3121	83 20 3	3136	81 52 37	3152
23	Spica W.	116 46 26	2895	118 18 51	2908	119 51 0	2922	121 22 51	2935
	Antares W.	70 52 28	2901	72 24 46	2912	73 56 50	2923	75 28 39	2935
	Saturn W.	50 43 37	2844	52 17 8	2856	53 50 23	2867	55 23 24	2879
	Venus E.	29 7 48	2330	27 42 15	2349	26 17 4	2369	24 52 16	2389
	α Pegasi E.	38 44 27	4047	37 33 34	4148	36 24 19	4259	35 16 48	4381
	SUN E.	74 40 3	3225	73 14 23	3238	71 48 59	3251	70 23 50	3264
24	Antares W.	83 4 27	2984	84 35 0	2993	86 5 21	3002	87 35 32	3010
	Saturn W.	63 4 57	2930	64 36 37	2939	66 8 6	2949	67 39 23	2957
	SUN E.	63 21 44	3322	61 57 58	3332	60 34 24	3343	59 11 2	3353
25	Antares W.	95 3 54	3048	96 33 8	3055	98 2 13	3061	99 31 10	3068
	Saturn W.	75 13 20	2994	76 43 40	3000	78 13 53	3006	79 43 58	3012
	α Aquilæ W.	53 12 43	4040	54 23 43	4008	55 35 15	3978	56 47 16	3952
	SUN E.	52 16 57	3398	50 54 38	3405	49 32 27	3414	48 10 26	3421
26	Antares W.	106 54 7	3095	108 22 23	3100	109 50 33	3105	111 18 37	3109
	Saturn W.	87 12 43	3036	88 42 11	3040	90 11 34	3043	91 40 53	3047
	α Aquilæ W.	62 53 19	3849	64 7 31	3833	65 21 59	3818	66 36 43	3804
	SUN E.	41 22 20	3454	40 1 5	3461	38 39 57	3468	37 18 57	3473
27	Saturn W.	99 6 33	3060	100 35 32	3061	102 4 30	3063	103 33 25	3064
	α Aquilæ W.	72 53 31	3752	74 9 24	3744	75 25 25	3736	76 41 34	3729
	Fomalhaut W.	37 49 41	3677	39 6 52	3642	40 24 41	3610	41 43 5	3580
	SUN E.	30 35 39	3506	29 15 21	3514	27 55 12	3521	26 35 11	3530



Day of the Month.	AYER's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	0.82337	1.31659	0.05135	1.45135	115.071	<sup>h</sup> 23 <sup>m</sup> 17 <sup>s</sup> 36.08
2	0.82790	1.30934	0.05205	1.45135	115.354	23 13 40.18
3	0.83274	1.30200	0.05276	1.45136	115.626	23 9 44.27
4	0.83786	1.29458	0.05348	1.45138	115.888	23 5 48.37
5	0.84324	1.28706	0.05420	1.45141	116.142	23 1 52.46
6	0.84889	1.27945	0.05493	1.45145	116.385	22 57 56.55
7	0.85479	1.27175	0.05565	1.45149	116.620	22 54 0.65
8	0.86091	1.26397	0.05639	1.45154	116.845	22 50 4.74
9	0.86726	1.25609	0.05713	1.45160	117.059	22 46 8.83
10	0.87381	1.24811	0.05788	1.45167	117.264	22 42 12.92
11	0.88056	1.24006	0.05863	1.45175	117.459	22 38 17.01
12	0.88748	1.23191	0.05939	1.45183	117.644	22 34 21.10
13	0.89457	1.22367	0.06016	1.45192	117.818	22 30 25.20
14	0.90181	1.21534	0.06093	1.45202	117.982	22 26 29.29
15	0.90919	1.20692	0.06171	1.45212	118.137	22 22 33.38
16	0.91671	1.19841	0.06250	1.45222	118.282	22 18 37.48
17	0.92435	1.18981	0.06329	1.45233	118.417	22 14 41.57
18	0.93210	1.18111	0.06409	1.45245	118.541	22 10 45.66
19	0.93993	1.17233	0.06490	1.45257	118.654	22 6 49.76
20	0.94785	1.16345	0.06572	1.45270	118.758	22 2 53.85
21	0.95586	1.15450	0.06655	1.45283	118.852	21 58 57.94
22	0.96394	1.14545	0.06738	1.45297	118.934	21 55 2.03
23	0.97209	1.13631	0.06823	1.45311	119.006	21 51 6.12
24	0.98028	1.12708	0.06909	1.45325	119.069	21 47 10.21
25	0.98849	1.11777	0.06995	1.45340	119.120	21 43 14.31
26	0.99675	1.10838	0.07082	1.45355	119.162	21 39 18.40
27	1.00506	1.09891	0.07170	1.45370	119.192	21 35 22.49
28	1.01339	1.08936	0.07258	1.45386	119.213	21 31 26.58
29	1.02171	1.07973	0.07347	1.45402	119.224	21 27 30.67
30	1.03004	1.07003	0.07438	1.45418	119.223	21 23 34.76
31	1.03839	1.06024	0.07529	1.45434	119.213	21 19 38.85



Day of the Month.	Bessel's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .75249.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D		Days.		
1	—1.2634	—0.6305	—8.8720	+0.5147	2404154	9	90	.2464
2	1.2618	0.6640	8.8613	0.5148	2404155	10	91	.2492
3	1.2600	0.6951	8.8502	0.5149	2404156	11	92	.2519
4	—1.2581	—0.7239	—8.8385	+0.5150	2404157	12	93	.2546
5	1.2560	0.7508	8.8266	0.5153	2404158	13	94	.2574
6	1.2538	0.7760	8.8142	0.5156	2404159	14	95	.2601
7	—1.2514	—0.7996	—8.8013	+0.5160	2404160	15	96	.2628
8	1.2490	0.8219	8.7879	0.5164	2404161	16	97	.2656
9	1.2463	0.8430	8.7739	0.5170	2404162	17	98	.2683
10	—1.2436	—0.8630	—8.7593	+0.5175	2404163	18	99	.2711
11	1.2407	0.8819	8.7440	0.5182	2404164	19	100	.2738
12	1.2376	0.9000	8.7280	0.5189	2404165	20	101	.2765
13	—1.2344	—0.9172	—8.7112	+0.5196	2404166	21	102	.2793
14	1.2311	0.9336	8.6936	0.5205	2404167	22	103	.2820
15	1.2276	0.9492	8.6751	0.5213	2404168	23	104	.2847
16	—1.2239	—0.9642	—8.6556	+0.5222	2404169	24	105	.2875
17	1.2201	0.9786	8.6348	0.5232	2404170	25	106	.2902
18	1.2161	0.9924	8.6126	0.5242	2404171	26	107	.2930
19	—1.2120	—1.0056	—8.5889	+0.5252	2404172	27	108	.2957
20	1.2077	1.0183	8.5637	0.5263	2404173	28	109	.2984
21	1.2032	1.0305	8.5366	0.5274	2404174	29	110	.3012
22	—1.1986	—1.0423	—8.5072	+0.5286	2404175	30	111	.3039
23	1.1938	1.0536	8.4754	0.5298	2404176	31	112	.3066
24	1.1888	1.0645	8.4406	0.5310	2404177	32	113	.3094
25	—1.1836	—1.0750	—8.4023	+0.5322	2404178	33	114	.3121
26	1.1782	1.0851	8.3598	0.5334	2404179	34	115	.3149
27	1.1727	1.0949	8.3122	0.5347	2404180	35	116	.3176
28	—1.1669	—1.1043	—8.2579	+0.5360	2404181	36	117	.3203
29	1.1610	1.1134	8.1951	0.5373	2404182	37	118	.3231
30	1.1548	1.1222	8.1206	0.5386	2404183	38	119	.3258
31	—1.1485	—1.1307	—8.0290	+0.5399	2404184	39	120	.3285

\* Add .0016 if Fraction be required for the time *t*, see page 329.

\* Add .0026 if Fraction be required for the time  $t$ , see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		h m s	s	° ' "	"	m s	m s	s
Sun.	1	2 33 47.70	9.545	N.15 5 54.1	45.35	1 6.05	3 2.73	0.311
Mon.	2	2 37 37.05	9.567	15 23 54.9	44.72	1 6.13	3 9.92	0.288
Tues.	3	2 41 26.94	9.590	15 41 40.5	44.08	1 6.21	3 16.57	0.266
Wed.	4	2 45 17.37	9.612	15 59 10.6	43.42	1 6.29	3 22.68	0.243
Thur.	5	2 49 8.34	9.635	16 16 24.8	42.75	1 6.37	3 28.24	0.220
Frid.	6	2 52 59.86	9.659	16 33 22.8	42.07	1 6.45	3 33.26	0.197
Sat.	7	2 56 51.95	9.682	16 50 4.3	41.38	1 6.53	3 37.72	0.174
Sun.	8	3 0 44.58	9.704	17 6 28.9	40.67	1 6.61	3 41.63	0.151
Mon.	9	3 4 37.76	9.727	17 22 36.2	39.94	1 6.70	3 44.99	0.129
Tues.	10	3 8 31.49	9.750	17 38 26.1	39.21	1 6.78	3 47.81	0.106
Wed.	11	3 12 25.78	9.774	17 53 58.3	38.46	1 6.86	3 50.07	0.083
Thur.	12	3 16 20.62	9.797	18 9 12.3	37.70	1 6.94	3 51.78	0.060
Frid.	13	3 20 16.03	9.821	18 24 8.0	36.94	1 7.03	3 52.92	0.036
Sat.	14	3 24 12.02	9.845	18 38 45.2	36.16	1 7.11	3 53.49	0.012
Sun.	15	3 28 8.57	9.868	18 53 3.5	35.36	1 7.19	3 53.49	0.012
Mon.	16	3 32 5.70	9.892	19 7 2.7	34.56	1 7.27	3 52.92	0.036
Tues.	17	3 36 3.41	9.916	19 20 42.6	33.75	1 7.35	3 51.77	0.059
Wed.	18	3 40 1.69	9.940	19 34 2.9	32.93	1 7.43	3 50.05	0.083
Thur.	19	3 44 0.55	9.964	19 47 3.3	32.10	1 7.51	3 47.76	0.107
Frid.	20	3 47 59.96	9.987	19 59 43.6	31.26	1 7.59	3 44.90	0.131
Sat.	21	3 51 59.94	10.011	20 12 3.6	30.40	1 7.66	3 41.49	0.154
Sun.	22	3 56 0.49	10.034	20 24 3.0	29.54	1 7.74	3 37.51	0.177
Mon.	23	4 0 1.59	10.057	20 35 41.5	28.67	1 7.81	3 32.98	0.200
Tues.	24	4 4 3.22	10.079	20 46 59.0	27.78	1 7.88	3 27.92	0.222
Wed.	25	4 8 5.36	10.100	20 57 55.1	26.89	1 7.95	3 22.34	0.243
Thur.	26	4 12 8.03	10.122	21 8 29.6	25.99	1 8.02	3 16.25	0.264
Frid.	27	4 16 11.21	10.143	21 18 42.3	25.07	1 8.09	3 9.66	0.285
Sat.	28	4 20 14.87	10.163	21 28 32.9	24.15	1 8.16	3 2.57	0.305
Sun.	29	4 24 19.00	10.182	21 38 1.4	23.22	1 8.22	2 55.02	0.324
Mon.	30	4 28 23.59	10.200	21 47 7.4	22.28	1 8.28	2 47.01	0.343
Tues.	31	4 32 28.61	10.218	21 55 50.7	21.33	1 8.34	2 38.56	0.360
Wed.	32	4 36 34.05	10.235	N.22 4 11.1	20.37	1 8.40	2 29.71	0.377

\* Mean Time of the Semidiameter passing may be found by subtracting 0<sup>h</sup>.18 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Sun.	1	2 33 48.18	N.15 5 56.4	15 54.0	3 2.75	2 36 50.93
Mon.	2	2 37 37.55	15 23 57.3	15 53.7	3 9.94	2 40 47.49
Tues.	3	2 41 27.46	15 41 43.0	15 53.5	3 16.58	2 44 44.04
Wed.	4	2 45 17.91	15 59 13.1	15 53.3	3 22.69	2 48 40.60
Thur.	5	2 49 8.90	16 16 27.3	15 53.1	3 28.25	2 52 37.15
Frid.	6	2 53 0.44	16 33 25.3	15 52.9	3 33.27	2 56 33.71
Sat.	7	2 56 52.54	16 50 6.8	15 52.6	3 37.73	3 0 30.27
Sun.	8	3 0 45.18	17 6 31.4	15 52.4	3 41.64	3 4 26.82
Mon.	9	3 4 38.37	17 22 38.7	15 52.2	3 45.00	3 8 23.37
Tues.	10	3 8 32.11	17 38 28.6	15 52.0	3 47.82	3 12 19.93
Wed.	11	3 12 26.40	17 54 0.8	15 51.8	3 50.08	3 16 16.48
Thur.	12	3 16 21.25	18 9 14.8	15 51.6	3 51.79	3 20 13.04
Frid.	13	3 20 16.67	18 24 10.4	15 51.4	3 52.92	3 24 9.59
Sat.	14	3 24 12.66	18 38 47.5	15 51.2	3 53.49	3 28 6.15
Sun.	15	3 28 9.21	18 53 5.8	15 51.0	3 53.49	3 32 2.70
Mon.	16	3 32 6.34	19 7 4.9	15 50.8	3 52.92	3 35 59.26
Tues.	17	3 36 4.05	19 20 44.7	15 50.6	3 51.77	3 39 55.82
Wed.	18	3 40 2.33	19 34 4.9	15 50.4	3 50.04	3 43 52.37
Thur.	19	3 44 1.18	19 47 5.3	15 50.2	3 47.75	3 47 48.93
Frid.	20	3 48 0.59	19 59 45.6	15 50.0	3 44.89	3 51 45.48
Sat.	21	3 52 0.56	20 12 5.5	15 49.9	3 41.48	3 55 42.04
Sun.	22	3 56 1.09	20 24 4.8	15 49.7	3 37.50	3 59 38.59
Mon.	23	4 0 2.18	20 35 43.2	15 49.5	3 32.97	4 3 35.15
Tues.	24	4 4 3.80	20 47 0.6	15 49.3	3 27.91	4 7 31.71
Wed.	25	4 8 5.93	20 57 56.6	15 49.2	3 22.33	4 11 28.26
Thur.	26	4 12 8.58	21 8 31.0	15 49.0	3 16.24	4 15 24.82
Frid.	27	4 16 11.74	21 18 43.6	15 48.8	3 9.64	4 19 21.38
Sat.	28	4 20 15.38	21 28 34.2	15 48.7	3 2.55	4 23 17.93
Sun.	29	4 24 19.49	21 38 2.5	15 48.6	2 55.00	4 27 14.49
Mon.	30	4 28 24.06	21 47 8.4	15 48.4	2 46.99	4 31 11.05
Tues.	31	4 32 29.06	21 55 51.6	15 48.3	2 38.54	4 35 7.60
Wed.	32	4 36 34.47	N.22 4 12.0	15 48.1	2 29.69	4 39 4.16

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	40° 52' 40.3"	S. 0° 87'	0.0035562	14° 46.1'	14° 47.7'	54' 6.3"	54' 12.3"
2	41° 50' 51.2"	0° 81'	0.0036621	14° 49.7'	14° 52.1'	54' 19.7"	54' 28.3"
3	42° 49' 0.3"	0° 74'	0.0037663	14° 54.8'	14° 57.9'	54' 38.3"	54' 49.7"
4	43° 47' 7.6"	0° 64'	0.0038689	15° 1.4'	15° 5.3'	55' 2.5"	55' 16.7"
5	44° 45' 13.1"	0° 54'	0.0039700	15° 9.6'	15° 14.3'	55' 32.5"	55' 49.8"
6	45° 43' 16.8"	0° 42'	0.0040695	15° 19.4'	15° 24.9'	56' 8.6"	56' 28.8"
7	46° 41' 18.5"	0° 29'	0.0041676	15° 30.8'	15° 37.1'	56' 50.4"	57' 13.3"
8	47° 39' 18.3"	0° 17'	0.0042643	15° 43.7'	15° 50.4'	57' 37.3"	58' 2.0"
9	48° 37' 16.1"	S. 0° 05'	0.0043595	15° 57.3'	16° 4.2'	58' 27.2"	58' 52.5"
10	49° 35' 12.1"	N. 0° 05'	0.0044535	16° 11.0'	16° 17.5'	59' 17.4"	59' 41.3"
11	50° 33' 6.3"	0° 13'	0.0045466	16° 23.6'	16° 29.1'	60' 3.6"	60' 23.7"
12	51° 30' 58.6"	0° 18'	0.0046387	16° 33.8'	16° 37.6'	60' 41.1"	60' 55.0"
13	52° 28' 49.2"	0° 20'	0.0047300	16° 40.3'	16° 41.8'	61' 5.0"	61' 10.6"
14	53° 26' 38.3"	0° 17'	0.0048206	16° 42.1'	16° 41.1'	61' 11.6"	61' 7.8"
15	54° 24' 25.9"	0° 10'	0.0049103	16° 38.7'	16° 35.2'	60' 59.2"	60' 46.2"
16	55° 22' 12.1"	N. 0° 01'	0.0049993	16° 30.5'	16° 24.9'	60' 29.1"	60' 8.4"
17	56° 19' 57.1"	S. 0° 11'	0.0050875	16° 18.4'	16° 11.3'	59' 44.7"	59' 18.7"
18	57° 17' 40.9"	0° 24'	0.0051747	16° 3.8'	15° 56.0'	58' 51.1"	58' 22.6"
19	58° 15' 23.6"	0° 38'	0.0052609	15° 48.2'	15° 40.4'	57' 53.8"	57' 25.3"
20	59° 13' 5.1"	0° 50'	0.0053459	15° 32.8'	15° 25.6'	56' 57.7"	56' 31.3"
21	60° 10' 45.6"	0° 62'	0.0054296	15° 18.8'	15° 12.6'	56' 6.5"	55' 43.6"
22	61° 8' 25.0"	0° 73'	0.0055117	15° 7.0'	15° 1.9'	55' 22.9"	55' 4.4"
23	62° 6' 3.4"	0° 82'	0.0055922	14° 57.5'	14° 53.8'	54' 48.3"	54' 34.6"
24	63° 3' 40.8"	0° 88'	0.0056709	14° 50.7'	14° 48.2'	54' 23.3"	54' 14.3"
25	64° 1' 17.3"	0° 91'	0.0057478	14° 46.4'	14° 45.2'	54' 7.7"	54' 3.2"
26	64° 58' 52.8"	0° 92'	0.0058227	14° 44.6'	14° 44.5'	54' 0.8"	54' 0.4"
27	65° 56' 27.4"	0° 91'	0.0058955	14° 44.9'	14° 45.7'	54' 1.9"	54' 5.0"
28	66° 54' 1.1"	0° 87'	0.0059662	14° 47.0'	14° 48.7'	54' 9.7"	54' 15.9"
29	67° 51' 33.8"	0° 81'	0.0060347	14° 50.7'	14° 53.0'	54' 23.3"	54' 31.9"
30	68° 49' 5.5"	0° 73'	0.0061008	14° 55.7'	14° 58.6"	54' 41.6"	54' 52.3"
31	69° 46' 36.2"	0° 62'	0.0061646	15° 1.8'	15° 5.2"	55' 3.9"	55' 16.4"
32	70° 44' 5.8"	S. 0° 51'	0.0062262	15° 8.8'	15° 12.6"	55' 29.6"	55' 43.7"



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	Longitude.		Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
Sun.	1	48° 47' 59".8	54° 46' 18".5	S. 4 28 31.0	S. 4 12 51.1	0.7	h m 0 34.6
Mon.	2	60 45 39.8	66 46 16.5	3 54 19.6	3 33 5.9	1.7	1 19.5
Tues.	3	72 48 22.2	78 52 12.9	3 9 21.5	2 43 19.2	2.7	2 6.5
Wed.	4	84 58 7.1	91 6 25.0	2 15 13.5	1 45 20.4	3.7	2 55.7
Thur.	5	97 17 29.3	103 31 44.9	1 13 57.0	S. 0 41 22.2	4.7	3 46.7
Frid.	6	109 49 38.4	116 11 37.8	S. 0 7 56.4	N. 0 25 58.6	5.7	4 39.0
Sat.	7	122 38 11.4	129 9 47.5	N. 0 59 59.2	1 33 40.1	6.7	5 31.9
Sun.	8	135 46 53.0	142 29 52.0	2 6 34.3	2 38 12.9	7.7	6 24.8
Mon.	9	149 19 4.3	156 14 43.9	3 8 5.7	3 35 41.3	8.7	7 17.2
Tues.	10	163 16 57.5	170 25 42.0	4 0 27.3	4 21 51.9	9.7	8 9.4
Wed.	11	177 40 43.3	185 1 35.9	4 39 23.7	4 52 34.7	10.7	9 1.7
Thur.	12	192 27 40.9	199 58 7.2	5 1 0.3	5 4 21.5	11.7	9 54.7
Frid.	13	207 31 52.3	215 7 44.4	5 2 26.4	4 55 11.6	12.7	10 49.3
Sat.	14	222 44 25.1	230 20 32.6	4 42 42.2	4 25 12.8	13.7	11 45.8
Sun.	15	237 54 46.5	245 25 50.2	4 3 6.7	3 36 54.2	14.7	12 44.5
Mon.	16	252 52 35.1	260 14 2.5	3 7 11.8	2 34 39.9	15.7	13 44.5
Tues.	17	267 29 25.7	274 38 10.7	2 0 0.5	1 23 55.8	16.7	14 44.6
Wed.	18	281 39 56.3	288 34 33.1	N. 0 47 6.3	N. 0 10 9.7	17.7	15 43.1
Thur.	19	295 22 2.5	302 2 35.6	S. 0 26 19.8	S. 1 1 51.8	18.7	16 38.5
Frid.	20	308 36 31.0	315 4 13.3	1 36 0.2	2 8 22.8	19.7	17 30.2
Sat.	21	321 26 12.0	327 42 59.7	2 38 40.8	3 6 38.4	20.7	18 18.3
Sun.	22	333 55 10.9	340 3 21.1	3 32 2.6	3 54 43.0	21.7	19 3.3
Mon.	23	346 8 5.9	352 10 0.6	4 14 30.7	4 31 18.4	22.7	19 46.1
Tues.	24	358 9 38.7	4 7 32.5	4 45 0.4	4 55 32.1	23.7	20 27.6
Wed.	25	10 4 12.3	16 0 6.2	5 2 49.7	5 6 50.8	24.7	21 8.6
Thur.	26	21 55 39.6	27 51 15.9	5 7 34.4	5 4 59.5	25.7	21 50.0
Frid.	27	33 47 16.0	39 43 58.1	4 59 7.2	4 49 59.7	26.7	22 32.5
Sat.	28	45 41 38.5	51 40 31.6	4 37 41.1	4 22 16.5	27.7	23 16.9
Sun.	29	57 40 50.2	63 42 45.4	4 3 53.3	3 42 40.4	28.7	6
Mon.	30	69 46 27.7	75 52 6.8	3 18 49.0	2 52 31.9	0.1	0 3.5
Tues.	31	81 59 52.5	88 9 54.1	2 24 4.0	1 53 42.3	1.1	0 52.4
Wed.	32	94 22 22.7	100 37 29.0	S. 1 21 45.4	S. 0 48 33.8	2.1	1 43.4



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 1.</b>				<b>TUESDAY 3.</b>			
0	h m s	N. ° ' "	"	0	h m s	N. ° ' "	"
0	3 10 24.37	N. 13 7 11.6	91.42	0	4 47 8.51	N. 19 13 4.4	58.23
1	3 12 20.75	13 16 18.6	90.90	1	4 49 14.44	19 18 51.2	57.37
2	3 14 17.31	13 25 22.4	90.37	2	4 51 20.58	19 24 32.8	56.49
3	3 16 14.04	13 34 23.0	89.84	3	4 53 26.92	19 30 9.1	55.61
4	3 18 10.95	13 43 20.5	89.30	4	4 55 33.47	19 35 40.1	54.72
5	3 20 8.04	13 52 14.6	88.74	5	4 57 40.23	19 41 5.8	53.83
6	3 22 5.31	14 1 5.4	88.19	6	4 59 47.19	19 46 26.1	52.93
7	3 24 2.76	14 9 52.9	87.63	7	5 1 54.35	19 51 41.0	52.02
8	3 26 0.39	14 18 36.9	87.05	8	5 4 1.71	19 56 50.4	51.11
9	3 27 58.21	14 27 17.5	86.47	9	5 6 9.28	20 1 54.3	50.18
10	3 29 56.22	14 35 54.6	85.89	10	5 8 17.05	20 6 52.6	49.26
11	3 31 54.42	14 44 28.2	85.30	11	5 10 25.02	20 11 45.4	48.33
12	3 33 52.80	14 52 58.2	84.70	12	5 12 33.19	20 16 32.5	47.38
13	3 35 51.38	15 1 24.6	84.09	13	5 14 41.56	20 21 14.0	46.44
14	3 37 50.15	15 9 47.3	83.47	14	5 16 50.13	20 25 49.8	45.48
15	3 39 49.11	15 18 6.3	82.85	15	5 18 58.89	20 30 19.8	44.52
16	3 41 48.26	15 26 21.5	82.22	16	5 21 7.85	20 34 44.1	43.56
17	3 43 47.61	15 34 32.9	81.58	17	5 23 17.00	20 39 2.5	42.59
18	3 45 47.16	15 42 40.5	80.94	18	5 25 26.35	20 43 15.1	41.62
19	3 47 46.90	15 50 44.2	80.29	19	5 27 35.88	20 47 21.9	40.63
20	3 49 46.85	15 58 44.0	79.63	20	5 29 45.61	20 51 27.7	39.63
21	3 51 46.99	16 6 39.8	78.97	21	5 31 55.53	20 55 17.5	38.64
22	3 53 47.33	16 14 31.6	78.29	22	5 34 5.63	20 59 6.4	37.64
23	3 55 47.88	N. 16 22 19.3	77.61	23	5 36 15.92	N. 21 2 49.2	36.63
<b>MONDAY 2.</b>				<b>WEDNESDAY 4.</b>			
0	3 57 48.63	N. 16 30 2.9	76.92	0	5 38 26.39	N. 21 6 26.0	35.62
1	3 59 49.58	16 37 42.4	76.23	1	5 40 37.05	21 9 56.6	34.59
2	4 1 50.73	16 45 17.7	75.52	2	5 42 47.88	21 13 21.1	33.57
3	4 3 52.09	16 52 48.7	74.81	3	5 44 58.90	21 16 39.5	32.54
4	4 5 53.66	17 0 15.4	74.09	4	5 47 10.09	21 19 51.6	31.50
5	4 7 55.43	17 7 37.8	73.37	5	5 49 21.46	21 22 57.5	30.46
6	4 9 57.40	17 14 55.9	72.64	6	5 51 33.00	21 25 57.1	29.41
7	4 11 59.58	17 22 9.5	71.90	7	5 53 44.71	21 28 50.4	28.36
8	4 14 1.97	17 29 18.7	71.16	8	5 55 56.59	21 31 37.4	27.31
9	4 16 4.57	17 36 23.4	70.41	9	5 58 8.64	21 34 18.1	26.24
10	4 18 7.37	17 43 23.6	69.64	10	6 0 20.86	21 36 52.3	25.17
11	4 20 10.38	17 50 19.1	68.87	11	6 2 33.24	21 39 20.1	24.10
12	4 22 13.60	17 57 10.1	68.10	12	6 4 45.79	21 41 41.5	23.02
13	4 24 17.03	18 3 56.4	67.32	13	6 6 58.49	21 43 56.4	21.94
14	4 26 20.67	18 10 37.9	66.53	14	6 9 11.35	21 46 4.8	20.83
15	4 28 24.51	18 17 14.7	65.73	15	6 11 24.37	21 48 6.6	19.76
16	4 30 28.57	18 23 46.6	64.92	16	6 13 37.54	21 50 1.9	18.67
17	4 32 32.83	18 30 13.7	64.12	17	6 15 50.86	21 51 50.6	17.57
18	4 34 37.30	18 36 36.0	63.30	18	6 18 4.33	21 53 32.7	16.46
19	4 36 41.98	18 42 53.3	62.47	19	6 20 17.94	21 55 8.1	15.35
20	4 38 46.87	18 49 5.6	61.63	20	6 22 31.69	21 56 36.9	14.24
21	4 40 51.97	18 55 12.9	60.80	21	6 24 45.59	21 57 59.0	13.12
22	4 42 57.28	19 1 15.2	59.96	22	6 26 59.63	21 59 14.4	12.00
23	4 45 2.79	19 7 12.4	59.10	23	6 29 13.80	22 0 23.0	10.88
24	4 47 8.51	N. 19 13 4.4	58.23	24	6 31 28.10	N. 22 1 24.9	9.75



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 5.</b>				<b>SATURDAY 7.</b>			
0	h m s 10	N. 22 1 24.9	9.75	0	h m s 99	N. 20 33 25.6	46.75
1	6 33 42.54	22 2 20.0	8.61	1	8 22 56.54	20 28 41.3	47.97
2	6 35 57.10	22 3 8.2	7.47	2	8 25 14.09	20 23 49.9	49.15
3	6 38 11.79	22 3 49.6	6.33	3	8 27 31.64	20 18 51.5	50.33
4	6 40 26.61	22 4 24.2	5.19	4	8 29 49.18	20 13 46.0	51.50
5	6 42 41.55	22 4 51.9	4.04	5	8 32 6.72	20 8 33.5	52.67
6	6 44 56.60	22 5 12.7	2.89	6	8 34 24.26	20 3 14.0	53.83
7	6 47 11.77	22 5 26.6	1.74	7	8 36 41.79	19 57 47.6	54.99
8	6 49 27.05	22 5 33.6	0.58	8	8 38 59.31	19 52 14.1	56.16
9	6 51 42.44	22 5 33.6	0.57	9	8 41 16.82	19 46 33.7	57.31
10	6 53 57.94	22 5 26.7	1.73	10	8 43 34.31	19 40 46.4	58.47
11	6 56 13.55	22 5 12.8	2.91	11	8 45 51.79	19 34 52.1	59.62
12	6 58 29.25	22 4 51.8	4.08	12	8 48 9.26	19 28 50.9	60.77
13	7 0 45.05	22 4 23.9	5.24	13	8 50 26.71	19 22 42.8	61.92
14	7 3 0.95	22 3 48.9	6.42	14	8 52 44.13	19 16 27.9	63.06
15	7 5 16.95	22 3 6.9	7.58	15	8 55 1.54	19 10 6.1	64.20
16	7 7 33.03	22 2 17.9	8.76	16	8 57 18.92	19 3 37.5	65.33
17	7 9 49.20	22 1 21.8	9.94	17	8 59 36.28	18 57 2.1	66.47
18	7 12 5.46	22 0 18.6	11.12	18	9 1 53.61	18 50 19.9	67.59
19	7 14 21.79	21 59 8.4	12.30	19	9 4 10.91	18 43 31.0	68.71
20	7 16 38.21	21 57 51.0	13.49	20	9 6 28.19	18 36 35.4	69.83
21	7 18 54.70	21 56 26.5	14.67	21	9 8 45.44	18 29 33.1	70.94
22	7 21 11.27	21 54 55.0	15.85	22	9 11 2.66	18 22 24.1	72.05
23	7 23 27.91	N. 21 53 16.3	17.04	23	9 13 19.84	N. 18 15 8.5	73.16
<b>FRIDAY 6.</b>				<b>SUNDAY 8.</b>			
0	7 25 44.61	N. 21 51 30.5	18.23	0	9 15 36.99	N. 18 7 46.2	74.27
1	7 28 1.38	21 49 37.5	19.42	1	9 17 54.11	18 0 17.3	75.37
2	7 30 18.22	21 47 37.4	20.61	2	9 20 11.20	17 52 41.9	76.4
3	7 32 35.11	21 45 30.2	21.80	3	9 22 28.25	17 45 0.0	77.5
4	7 34 52.06	21 43 15.8	23.00	4	9 24 45.27	17 37 11.5	78.6
5	7 37 9.07	21 40 54.2	24.19	5	9 27 2.25	17 29 16.6	79.6
6	7 39 26.13	21 38 25.5	25.38	6	9 29 19.19	17 21 15.3	80.7
7	7 41 43.24	21 35 49.6	26.58	7	9 31 36.09	17 13 7.5	81.8
8	7 44 0.39	21 33 6.5	27.77	8	9 33 52.96	17 4 53.4	82.8
9	7 46 17.59	21 30 16.3	28.97	9	9 36 9.78	16 56 33.0	83.9
10	7 48 34.83	21 27 18.9	30.16	10	9 38 26.57	16 48 6.3	84.9
11	7 50 52.10	21 24 14.4	31.34	11	9 40 43.32	16 39 33.2	86.0
12	7 53 9.41	21 21 2.8	32.53	12	9 43 0.02	16 30 54.0	87.0
13	7 55 26.75	21 17 44.0	33.73	13	9 45 16.69	16 22 8.6	88.0
14	7 57 44.13	21 14 18.0	34.93	14	9 47 33.31	16 13 17.0	89.1
15	8 0 1.53	21 10 44.8	36.12	15	9 49 49.90	16 4 19.3	90.1
16	8 2 18.95	21 7 4.5	37.32	16	9 52 6.44	15 55 15.6	91.1
17	8 4 36.40	21 3 17.0	38.51	17	9 54 22.95	15 46 5.8	92.1
18	8 6 53.87	20 59 22.4	39.69	18	9 56 39.42	15 36 50.0	93.1
19	8 9 11.36	20 55 20.7	40.88	19	9 58 55.85	15 27 28.3	94.1
20	8 11 28.87	20 51 11.9	42.06	20	10 1 12.23	15 18 0.6	95.1
21	8 13 46.38	20 46 56.0	43.25	21	10 3 28.58	15 8 27.1	96.1
22	8 16 3.91	20 42 32.9	44.43	22	10 5 44.89	14 58 47.8	97.1
23	8 18 21.45	20 38 2.8	45.61	23	10 8 1.16	14 49 2.7	98.1
24	8 20 38.99	N. 20 33 25.6	46.79	24	10 10 17.39	N. 14 39 11.9	99.1



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 9.</b>				<b>WEDNESDAY 11.</b>			
0	<sup>h</sup> 10 <sup>m</sup> 17 <sup>s</sup> 39	N. 14 39 11' 9"	98' 94"	0	<sup>h</sup> 11 <sup>m</sup> 58 <sup>s</sup> 54' 82"	N. 5 11 41' 5"	133' 50"
1	10 12 33' 58"	14 29 15' 4"	99' 88"	1	12 1 10' 88"	4 58 19' 2"	133' 94"
2	10 14 49' 74"	14 19 13' 3"	100' 82"	2	12 3 26' 99"	4 44 54' 2"	134' 37"
3	10 17 5' 86"	14 9 5' 5"	101' 76"	3	12 5 43' 15"	4 31 26' 8"	134' 78"
4	10 19 21' 95"	13 58 52' 2"	102' 68"	4	12 7 59' 37"	4 17 56' 9"	135' 18"
5	10 21 38' 00"	13 48 33' 4"	103' 58"	5	12 10 15' 65"	4 4 24' 7"	135' 57"
6	10 23 54' 02"	13 38 9' 2"	104' 49"	6	12 12 31' 98"	3 50 50' 1"	135' 94"
7	10 26 10' 00"	13 27 39' 5"	105' 39"	7	12 14 48' 38"	3 37 13' 4"	136' 29"
8	10 28 25' 95"	13 17 4' 5"	106' 28"	8	12 17 4' 85"	3 23 34' 6"	136' 63"
9	10 30 41' 87"	13 6 24' 2"	107' 16"	9	12 19 21' 38"	3 9 53' 8"	136' 96"
10	10 32 57' 76"	12 55 38' 6"	108' 02"	10	12 21 37' 99"	2 56 11' 1"	137' 28"
11	10 35 13' 62"	12 44 47' 9"	108' 88"	11	12 23 54' 67"	2 42 26' 5"	137' 58"
12	10 37 29' 45"	12 33 52' 0"	109' 74"	12	12 26 11' 43"	2 28 40' 1"	137' 87"
13	10 39 45' 26"	12 22 51' 0"	110' 58"	13	12 28 28' 27"	2 14 52' 1"	138' 13"
14	10 42 1' 04"	12 11 45' 0"	111' 42"	14	12 30 45' 19"	2 1 2' 5"	138' 39"
15	10 44 16' 80"	12 0 34' 0"	112' 24"	15	12 33 2' 20"	1 47 11' 4"	138' 64"
16	10 46 32' 54"	11 49 18' 1"	113' 05"	16	12 35 19' 30"	1 33 18' 8"	138' 87"
17	10 48 48' 25"	11 37 57' 4"	113' 86"	17	12 37 36' 49"	1 19 25' 0"	139' 07"
18	10 51 3' 95"	11 26 31' 8"	114' 67"	18	12 39 53' 77"	1 5 30' 0"	139' 27"
19	10 53 19' 62"	11 15 1' 4"	115' 45"	19	12 42 11' 15"	0 51 33' 8"	139' 45"
20	10 55 35' 28"	11 3 26' 4"	116' 23"	20	12 44 28' 63"	0 37 36' 6"	139' 62"
21	10 57 50' 93"	10 51 46' 7"	117' 00"	21	12 46 46' 21"	0 23 38' 4"	139' 77"
22	11 0 6' 56"	10 40 2' 4"	117' 75"	22	12 49 3' 90"	N. 0 9 39' 4"	139' 90"
23	11 2 22' 18"	N. 10 28 13' 7"	118' 49"	23	12 51 21' 70"	S. 0 4 20' 4"	140' 02"
<b>TUESDAY 10.</b>				<b>THURSDAY 12.</b>			
0	11 4 37' 79"	N. 10 16 20' 5"	119' 23"	0	12 53 39' 61"	S. 0 18 20' 8"	140' 12"
1	11 6 53' 39"	10 4 22' 9"	119' 96"	1	12 55 57' 63"	0 32 21' 8"	140' 21"
2	11 9 8' 99"	9 52 21' 0"	120' 67"	2	12 58 15' 77"	0 46 23' 3"	140' 28"
3	11 11 24' 58"	9 40 14' 9"	121' 37"	3	13 0 34' 03"	1 0 25' 2"	140' 33"
4	11 13 40' 17"	9 28 4' 5"	122' 07"	4	13 2 52' 41"	1 14 27' 3"	140' 37"
5	11 15 55' 76"	9 15 50' 0"	122' 75"	5	13 5 10' 92"	1 28 29' 6"	140' 39"
6	11 18 11' 35"	9 3 31' 5"	123' 42"	6	13 7 29' 55"	1 42 32' 0"	140' 39"
7	11 20 26' 95"	8 51 9' 0"	124' 08"	7	13 9 48' 31"	1 56 34' 3"	140' 38"
8	11 22 42' 55"	8 38 42' 5"	124' 74"	8	13 12 7' 21"	2 10 36' 6"	140' 36"
9	11 24 58' 15"	8 26 12' 1"	125' 38"	9	13 14 26' 25"	2 24 38' 7"	140' 32"
10	11 27 13' 77"	8 13 38' 0"	126' 00"	10	13 16 45' 42"	2 38 40' 4"	140' 25"
11	11 29 29' 40"	8 1 0' 1"	126' 62"	11	13 19 4' 73"	2 52 41' 7"	140' 17"
12	11 31 45' 05"	7 48 18' 6"	127' 22"	12	13 21 24' 19"	3 6 42' 5"	140' 08"
13	11 34 0' 71"	7 35 33' 5"	127' 81"	13	13 23 43' 79"	3 20 42' 7"	139' 97"
14	11 36 16' 39"	7 22 44' 9"	128' 39"	14	13 26 3' 55"	3 34 42' 1"	139' 84"
15	11 38 32' 10"	7 9 52' 8"	128' 97"	15	13 28 23' 45"	3 48 40' 8"	139' 70"
16	11 40 47' 83"	6 56 57' 3"	129' 52"	16	13 30 43' 51"	4 2 38' 5"	139' 53"
17	11 43 3' 58"	6 43 58' 6"	130' 06"	17	13 33 3' 73"	4 16 35' 1"	139' 34"
18	11 45 19' 36"	6 30 56' 6"	130' 59"	18	13 35 24' 10"	4 30 30' 6"	139' 15"
19	11 47 35' 18"	6 17 51' 5"	131' 11"	19	13 37 44' 64"	4 44 24' 9"	138' 94"
20	11 49 51' 03"	6 4 43' 3"	131' 61"	20	13 40 5' 33"	4 58 17' 9"	138' 71"
21	11 52 6' 92"	5 51 32' 2"	132' 10"	21	13 42 26' 20"	5 12 9' 4"	138' 45"
22	11 54 22' 84"	5 38 18' 1"	132' 58"	22	13 44 47' 23"	5 25 59' 3"	138' 18"
23	11 56 38' 81"	5 25 1' 2"	133' 05"	23	13 47 8' 44"	5 39 47' 6"	137' 90"
24	11 58 54' 82"	N. 5 11 41' 5"	133' 50"	24	13 49 29' 81"	S. 5 53 34' 1"	137' 59"



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 13.</b>				<b>SUNDAY 15.</b>			
0	<sup>h</sup> 13 <sup>m</sup> 49 <sup>s</sup> 29.81	S. 5 53 34.1	137.59	0	<sup>h</sup> 15 <sup>m</sup> 46 <sup>s</sup> 22.53	S. 15 45 26.4	102.41
1	13 51 51.36	6 7 18.7	137.27	1	15 48 53.40	15 55 37.5	101.28
2	13 54 13.08	6 21 1.4	136.93	2	15 51 24.45	16 5 41.7	100.13
3	13 56 34.98	6 34 41.9	136.57	3	15 53 55.67	16 15 39.0	98.96
4	13 58 57.07	6 48 20.3	136.20	4	15 56 27.06	16 25 29.2	97.78
5	14 1 19.33	7 1 56.3	135.81	5	15 58 58.62	16 35 12.4	96.60
6	14 3 41.78	7 15 30.0	135.41	6	16 1 30.34	16 44 48.4	95.39
7	14 6 4.1	7 29 1.2	134.98	7	16 4 2.22	16 54 17.1	94.17
8	14 8 27.24	7 42 29.7	134.53	8	16 6 34.25	17 3 38.5	92.94
9	14 10 50.25	7 55 55.5	134.07	9	16 9 6.44	17 12 52.4	91.70
10	14 13 13.45	8 9 18.5	133.58	10	16 11 38.78	17 21 58.9	90.45
11	14 15 36.84	8 22 38.5	133.08	11	16 14 11.27	17 30 57.8	89.18
12	14 18 0.43	8 35 55.5	132.57	12	16 16 43.90	17 39 49.1	87.91
13	14 20 24.21	8 49 9.3	132.03	13	16 19 16.67	17 48 32.7	86.61
14	14 22 48.18	9 2 19.9	131.48	14	16 21 49.57	17 57 8.4	85.30
15	14 25 12.36	9 15 27.1	130.91	15	16 24 22.61	18 5 36.3	84.00
16	14 27 36.73	9 28 30.8	130.32	16	16 26 55.77	18 13 56.4	82.68
17	14 30 1.30	9 41 30.9	129.72	17	16 29 29.05	18 22 8.4	81.34
18	14 32 26.07	9 54 27.4	129.09	18	16 32 2.45	18 30 12.4	79.99
19	14 34 51.03	10 7 20.0	128.44	19	16 34 35.97	18 38 8.3	78.63
20	14 37 16.20	10 20 8.7	127.78	20	16 37 9.59	18 45 56.0	77.27
21	14 39 41.58	10 32 53.4	127.11	21	16 39 43.32	18 53 35.5	75.89
22	14 42 7.15	10 45 34.0	126.42	22	16 42 17.14	19 1 6.7	74.52
23	14 44 32.93	S. 10 58 10.4	125.71	23	16 44 51.06	S. 19 8 29.7	73.13
<b>SATURDAY 14.</b>				<b>MONDAY 16.</b>			
0	14 46 58.90	S. 11 10 42.5	124.98	0	16 47 25.07	S. 19 15 44.2	71.72
1	14 49 25.08	11 23 10.1	124.23	1	16 49 59.16	19 22 50.3	70.31
2	14 51 51.47	11 35 33.2	123.46	2	16 52 33.34	19 29 47.9	68.88
3	14 54 18.06	11 47 51.6	122.67	3	16 55 7.58	19 36 36.9	67.46
4	14 56 44.85	12 0 5.2	121.87	4	16 57 41.89	19 43 17.4	66.03
5	14 59 11.85	12 12 14.0	121.06	5	17 0 16.27	19 49 49.3	64.59
6	15 1 39.05	12 24 17.9	120.23	6	17 2 50.70	19 56 12.5	63.14
7	15 4 6.45	12 36 16.7	119.37	7	17 5 25.18	20 2 27.0	61.69
8	15 6 34.06	12 48 10.3	118.50	8	17 7 59.70	20 8 32.8	60.23
9	15 9 1.87	12 59 58.7	117.62	9	17 10 34.27	20 14 29.8	58.77
10	15 11 29.88	13 11 41.7	116.72	10	17 13 8.87	20 20 18.0	57.29
11	15 13 58.09	13 23 19.3	115.79	11	17 15 43.50	20 25 57.3	55.82
12	15 16 26.50	13 34 51.2	114.85	12	17 18 18.14	20 31 27.8	54.34
13	15 18 55.11	13 46 17.5	113.91	13	17 20 52.80	20 36 49.4	52.85
14	15 21 23.92	13 57 38.1	112.94	14	17 23 27.48	20 42 2.0	51.36
15	15 23 52.92	14 8 52.8	111.96	15	17 26 2.16	20 47 5.7	49.87
16	15 26 22.12	14 20 1.6	110.96	16	17 28 36.83	20 52 0.5	48.37
17	15 28 51.52	14 31 4.3	109.94	17	17 31 11.49	20 56 46.2	46.87
18	15 31 21.10	14 42 0.9	108.91	18	17 33 46.14	21 1 22.9	45.37
19	15 33 50.87	14 52 51.2	107.87	19	17 36 20.76	21 5 50.6	43.86
20	15 36 20.84	15 3 35.3	106.81	20	17 38 55.36	21 10 9.2	42.35
21	15 38 50.99	15 14 12.9	105.73	21	17 41 29.92	21 14 18.8	40.85
22	15 41 21.32	15 24 44.0	104.64	22	17 44 4.45	21 18 19.4	39.33
23	15 43 51.83	15 35 8.6	103.53	23	17 46 38.92	21 22 10.8	37.82
24	15 46 22.53	S. 15 45 26.4	102.41	24	17 49 13.34	S. 21 25 53.2	36.31



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>TUESDAY 17.</b>				<b>THURSDAY 19.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	17 49 13.34	S. 21 25 53.2	36.31	0	19 49 40.33	S. 21 30 36.7	32.13
1	17 51 47.70	21 29 26.5	34.78	1	19 52 4.83	21 27 20.2	33.38
2	17 54 21.99	21 32 50.6	33.27	2	19 54 29.00	21 23 56.2	34.62
3	17 56 56.20	21 36 5.7	31.76	3	19 56 52.86	21 20 24.8	35.84
4	17 59 30.34	21 39 11.7	30.24	4	19 59 16.39	21 16 46.1	37.05
5	18 2 4.39	21 42 8.6	28.73	5	20 1 39.59	21 13 0.2	38.25
6	18 4 38.34	21 44 56.4	27.21	6	20 4 2.47	21 9 7.1	39.44
7	18 7 12.19	21 47 35.1	25.70	7	20 6 25.01	21 5 6.9	40.63
8	18 9 45.94	21 50 4.8	24.19	8	20 8 47.22	21 0 59.6	41.80
9	18 12 19.58	21 52 25.4	22.68	9	20 11 9.09	20 56 45.3	42.96
10	18 14 53.10	21 54 36.9	21.17	10	20 13 30.63	20 52 24.1	44.12
11	18 17 26.49	21 56 39.4	19.66	11	20 15 51.82	20 47 55.9	45.26
12	18 19 59.75	21 58 32.8	18.15	12	20 18 12.67	20 43 21.0	46.38
13	18 22 32.87	22 0 17.2	16.66	13	20 20 33.18	20 38 39.4	47.50
14	18 25 5.85	22 1 52.7	15.17	14	20 22 53.35	20 33 51.0	48.61
15	18 27 38.68	22 3 19.2	13.67	15	20 25 13.17	20 28 56.1	49.70
16	18 30 11.34	22 4 36.7	12.17	16	20 27 32.64	20 23 54.6	50.78
17	18 32 43.85	22 5 45.3	10.68	17	20 29 51.76	20 18 46.7	51.86
18	18 35 16.19	22 6 44.9	9.20	18	20 32 10.53	20 13 32.3	52.92
19	18 37 48.35	22 7 35.7	7.73	19	20 34 28.95	20 8 11.6	53.97
20	18 40 20.33	22 8 17.7	6.27	20	20 36 47.01	20 2 44.6	55.02
21	18 42 52.12	22 8 50.9	4.79	21	20 39 4.73	19 57 11.4	56.05
22	18 45 23.72	22 9 15.2	3.33	22	20 41 22.09	19 51 32.0	57.07
23	18 47 55.12	S. 22 9 30.8	1.87	23	20 43 39.09	S. 19 45 46.5	58.08
<b>WEDNESDAY 18.</b>				<b>FRIDAY 20.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	18 50 26.31	S. 22 9 37.7	0.42	0	20 45 55.74	S. 19 39 55.1	59.07
1	18 52 57.29	22 9 35.9	1.02	1	20 48 12.04	19 33 57.7	60.05
2	18 55 28.06	22 9 25.5	2.46	2	20 50 27.98	19 27 54.5	61.02
3	18 57 58.61	22 9 6.4	3.90	3	20 52 43.56	19 21 45.4	61.99
4	19 0 28.93	22 8 38.7	5.32	4	20 54 58.79	19 15 30.6	62.94
5	19 2 59.02	22 8 2.6	6.73	5	20 57 13.67	19 9 10.1	63.88
6	19 5 28.87	22 7 17.9	8.15	6	20 59 28.19	19 2 44.0	64.81
7	19 7 58.48	22 6 24.8	9.55	7	21 1 42.35	18 56 12.4	65.73
8	19 10 27.85	22 5 23.3	10.95	8	21 3 56.17	18 49 35.2	66.64
9	19 12 56.06	22 4 13.4	12.34	9	21 6 9.63	18 42 52.7	67.53
10	19 15 25.81	22 2 55.2	13.72	10	21 8 22.73	18 36 4.8	68.42
11	19 17 54.40	22 1 28.8	15.09	11	21 10 35.49	18 29 11.7	69.29
12	19 20 22.73	21 59 54.1	16.46	12	21 12 47.89	18 22 13.3	70.16
13	19 22 50.78	21 58 11.3	17.81	13	21 14 59.94	18 15 9.8	71.01
14	19 25 18.56	21 56 20.4	19.16	14	21 17 11.65	18 8 1.2	71.85
15	19 27 46.06	21 54 21.4	20.50	15	21 19 23.00	18 0 47.6	72.68
16	19 30 13.27	21 52 14.4	21.83	16	21 21 34.01	17 53 29.0	73.51
17	19 32 40.20	21 49 59.4	23.15	17	21 23 44.67	17 46 5.5	74.32
18	19 35 6.84	21 47 36.6	24.46	18	21 25 54.98	17 38 37.2	75.12
19	19 37 33.18	21 45 5.9	25.77	19	21 28 4.95	17 31 4.1	75.91
20	19 39 59.22	21 42 27.4	27.06	20	21 30 14.58	17 23 26.3	76.68
21	19 42 24.96	21 39 41.2	28.34	21	21 32 23.86	17 15 43.9	77.45
22	19 44 50.40	21 36 47.3	29.62	22	21 34 32.81	17 7 56.9	78.22
23	19 47 15.52	21 33 45.8	30.88	23	21 36 41.42	17 0 5.3	78.97
24	19 49 40.33	S. 21 30 36.7	32.13	24	21 38 49.69	S. 16 52 9.3	79.70



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 21.</b>				<b>MONDAY 23.</b>			
0	h m s 21 38 49.69	S. 16 52 9.3	79° 70'	0	h m s 23 15 38.22	S. 9 22 46.8	104° 19'
1	21 40 57.63	16 44 8.9	80° 42'	1	23 17 33.15	9 12 20.7	104° 50'
2	21 43 5.24	16 36 4.2	81° 14'	2	23 19 27.89	9 1 52.8	104° 80'
3	21 45 12.51	16 27 55.2	81° 85'	3	23 21 22.43	8 51 23.1	105° 09'
4	21 47 19.46	16 19 42.0	82° 54'	4	23 23 16.79	8 40 51.7	105° 38'
5	21 49 26.08	16 11 24.7	83° 23'	5	23 25 10.96	8 30 18.6	105° 66'
6	21 51 32.37	16 3 3.3	83° 91'	6	23 27 4.96	8 19 43.8	105° 94'
7	21 53 38.35	15 54 37.8	84° 58'	7	23 28 58.77	8 9 7.3	106° 21'
8	21 55 44.00	15 46 8.4	85° 23'	8	23 30 52.41	7 58 29.3	106° 47'
9	21 57 49.33	15 37 35.0	85° 88'	9	23 32 45.89	7 47 49.7	106° 72'
10	21 59 54.35	15 28 57.8	86° 51'	10	23 34 39.20	7 37 8.7	106° 96'
11	22 1 59.06	15 20 16.9	87° 14'	11	23 36 32.34	7 26 26.2	107° 21'
12	22 4 3.45	15 11 32.1	87° 77'	12	23 38 25.32	7 15 42.2	107° 44'
13	22 6 7.54	15 2 43.7	88° 38'	13	23 40 18.15	7 4 56.9	107° 66'
14	22 8 11.32	14 53 51.6	88° 98'	14	23 42 10.82	6 54 10.3	107° 87'
15	22 10 14.80	14 44 56.0	89° 56'	15	23 44 3.35	6 43 22.4	108° 09'
16	22 12 17.97	14 35 56.9	90° 14'	16	23 45 55.73	6 32 33.2	108° 30'
17	22 14 20.85	14 26 54.3	90° 72'	17	23 47 47.96	6 21 42.8	108° 49'
18	22 16 23.43	14 17 48.3	91° 28'	18	23 49 40.06	6 10 51.3	108° 68'
19	22 18 25.72	14 8 39.0	91° 83'	19	23 51 32.03	5 59 58.6	108° 87'
20	22 20 27.72	13 59 26.4	92° 37'	20	23 53 23.86	5 49 4.8	109° 05'
21	22 22 29.43	13 50 10.6	92° 90'	21	23 55 15.57	5 38 10.0	109° 22'
22	22 24 30.86	13 40 51.6	93° 43'	22	23 57 7.15	5 27 14.1	109° 39'
23	22 26 32.01	S. 13 31 29.4	93° 95'	23	23 58 58.62	S. 5 16 17.3	109° 55'
<b>SUNDAY 22.</b>				<b>TUESDAY 24.</b>			
0	22 28 32.87	S. 13 22 4.2	94° 45'	0	0 0 49.96	S. 5 5 19.5	109° 71'
1	22 30 33.46	13 12 36.0	94° 96'	1	0 2 41.19	4 54 20.8	109° 85'
2	22 32 33.78	13 3 4.7	95° 45'	2	0 4 32.31	4 43 21.3	109° 99'
3	22 34 33.83	12 53 30.6	95° 93'	3	0 6 23.32	4 32 20.9	110° 12'
4	22 36 33.62	12 43 53.6	96° 40'	4	0 8 14.23	4 21 19.8	110° 25'
5	22 38 33.14	12 34 13.8	96° 87'	5	0 10 5.04	4 10 17.9	110° 38'
6	22 40 32.40	12 24 31.2	97° 33'	6	0 11 55.76	3 59 15.2	110° 50'
7	22 42 31.40	12 14 45.9	97° 78'	7	0 13 46.38	3 48 11.9	110° 60'
8	22 44 30.15	12 4 57.9	98° 22'	8	0 15 36.91	3 37 8.0	110° 71'
9	22 46 28.65	11 55 7.3	98° 65'	9	0 17 27.35	3 26 3.4	110° 81'
10	22 48 26.90	11 45 14.1	99° 07'	10	0 19 17.71	3 14 58.3	110° 89'
11	22 50 24.91	11 35 18.4	99° 48'	11	0 21 8.00	3 3 52.7	110° 98'
12	22 52 22.67	11 25 20.3	99° 89'	12	0 22 58.21	2 52 46.5	111° 07'
13	22 54 20.20	11 15 19.7	100° 29'	13	0 24 48.35	2 41 39.9	111° 14'
14	22 56 17.49	11 5 16.8	100° 68'	14	0 26 38.42	2 30 32.8	111° 21'
15	22 58 14.55	10 55 11.5	101° 07'	15	0 28 28.42	2 19 25.4	111° 26'
16	23 0 11.38	10 45 4.0	101° 44'	16	0 30 18.36	2 8 17.7	111° 32'
17	23 2 7.98	10 34 54.2	101° 82'	17	0 32 8.24	1 57 9.6	111° 37'
18	23 4 4.37	10 24 42.2	102° 18'	18	0 33 58.07	1 46 1.2	111° 42'
19	23 6 0.54	10 14 28.0	102° 53'	19	0 35 47.85	1 34 52.6	111° 45'
20	23 7 56.49	10 4 11.8	102° 88'	20	0 37 37.58	1 23 43.8	111° 48'
21	23 9 52.23	9 53 53.5	103° 22'	21	0 39 27.27	1 12 34.8	111° 51'
22	23 11 47.76	9 43 33.2	103° 54'	22	0 41 16.92	1 1 25.7	111° 53'
23	23 13 43.09	9 33 11.0	103° 87'	23	0 43 6.53	0 50 16.5	111° 54'
24	23 15 38.22	S. 9 22 46.8	104° 19'	24	0 44 56.10	S. 0 39 7.2	111° 55'



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>WEDNESDAY 25.</b>				<b>FRIDAY 27.</b>			
0	h m s 0 44 56.10	S. 0 39 7.2	111.55	0	h m s 2 12 59.92	N. 8 5 37.6	104.73
1	0 46 45.64	0 27 57.9	111.55	1	2 14 51.78	8 16 5.1	104.43
2	0 48 35.16	0 16 48.6	111.54	2	2 16 43.75	8 26 30.8	104.13
3	0 50 24.66	S. 0 5 39.4	111.53	3	2 18 35.85	8 36 54.7	103.82
4	0 52 14.13	N. 0 5 29.7	111.51	4	2 20 28.08	8 47 16.7	103.50
5	0 54 3.59	0 16 38.7	111.49	5	2 22 20.43	8 57 36.7	103.18
6	0 55 53.03	0 27 47.6	111.46	6	2 24 12.92	9 7 54.8	102.85
7	0 57 42.47	0 38 56.3	111.43	7	2 26 5.55	9 18 10.9	102.52
8	0 59 31.89	0 50 4.8	111.38	8	2 27 58.31	9 28 25.0	102.17
9	1 1 21.31	1 1 12.9	111.33	9	2 29 51.21	9 38 36.9	101.81
10	1 3 10.73	1 12 20.8	111.29	10	2 31 44.25	9 48 46.7	101.46
11	1 5 0.16	1 23 28.4	111.23	11	2 33 37.43	9 58 54.4	101.09
12	1 6 49.59	1 34 35.5	111.15	12	2 35 30.76	10 8 59.8	100.72
13	1 8 39.03	1 45 42.2	111.08	13	2 37 24.24	10 19 3.0	100.34
14	1 10 28.48	1 56 48.5	111.01	14	2 39 17.87	10 29 3.9	99.95
15	1 12 17.95	2 7 54.4	110.93	15	2 41 11.66	10 39 2.4	99.55
16	1 14 7.44	2 18 59.7	110.83	16	2 43 5.60	10 48 58.5	99.16
17	1 15 56.95	2 30 4.4	110.74	17	2 44 59.71	10 58 52.3	98.75
18	1 17 46.49	2 41 8.6	110.64	18	2 46 53.97	11 8 43.6	98.33
19	1 19 36.05	2 52 12.1	110.53	19	2 48 48.40	11 18 32.3	97.91
20	1 21 25.65	3 3 15.0	110.42	20	2 50 43.00	11 28 18.5	97.48
21	1 23 15.28	3 14 17.2	110.30	21	2 52 37.76	11 38 2.1	97.05
22	1 25 4.95	3 25 18.6	110.18	22	2 54 32.69	11 47 43.1	96.61
23	1 26 54.66	N. 3 36 19.3	110.05	23	2 56 27.79	N. 11 57 21.4	96.16
<b>THURSDAY 26.</b>				<b>SATURDAY 28.</b>			
0	1 28 44.41	N. 3 47 19.2	109.91	0	2 58 23.07	N. 12 6 57.0	95.70
1	1 30 34.21	3 58 18.2	109.77	1	3 0 18.52	12 16 29.8	95.23
2	1 32 24.07	4 9 16.4	109.62	2	3 2 14.16	12 25 59.8	94.76
3	1 34 13.98	4 20 13.6	109.46	3	3 4 9.97	12 35 26.9	94.28
4	1 36 3.94	4 31 9.9	109.30	4	3 6 5.96	12 44 51.2	93.80
5	1 37 53.97	4 42 5.2	109.13	5	3 8 2.14	12 54 12.5	93.30
6	1 39 44.06	4 52 59.5	108.96	6	3 9 58.51	13 3 30.8	92.79
7	1 41 34.22	5 3 52.7	108.78	7	3 11 55.06	13 12 46.0	92.28
8	1 43 24.44	5 14 44.8	108.59	8	3 13 51.81	13 21 58.2	91.77
9	1 45 14.74	5 25 35.8	108.40	9	3 15 48.74	13 31 7.3	91.25
10	1 47 5.11	5 36 25.6	108.20	10	3 17 45.87	13 40 13.2	90.71
11	1 48 55.56	5 47 14.2	107.99	11	3 19 43.20	13 49 15.8	90.17
12	1 50 46.10	5 58 1.5	107.78	12	3 21 40.72	13 58 15.2	89.63
13	1 52 36.72	6 8 47.5	107.56	13	3 23 38.44	14 7 11.3	89.08
14	1 54 27.42	6 19 32.2	107.34	14	3 25 36.36	14 16 4.1	88.51
15	1 56 18.22	6 30 15.6	107.11	15	3 27 34.48	14 24 53.4	87.93
16	1 58 9.11	6 40 57.5	106.87	16	3 29 32.81	14 33 39.3	87.36
17	2 0 0.10	6 51 38.0	106.63	17	3 31 31.34	14 42 21.7	86.78
18	2 1 51.18	7 2 17.0	106.38	18	3 33 30.07	14 51 0.6	86.18
19	2 3 42.37	7 12 54.5	106.12	19	3 35 29.02	14 59 35.9	85.58
20	2 5 33.66	7 23 30.4	105.85	20	3 37 28.17	15 8 7.6	84.97
21	2 7 25.06	7 34 4.7	105.58	21	3 39 27.53	15 16 35.6	84.36
22	2 9 16.56	7 44 37.4	105.31	22	3 41 27.11	15 24 59.9	83.73
23	2 11 8.18	7 55 8.4	105.02	23	3 43 26.89	15 33 20.4	83.09
24	2 12 59.92	N. 8 5 37.6	104.73	24	3 45 26.89	N. 15 41 37.0	82.45



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
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## SUNDAY 29.

	<sup>h</sup> h	<sup>m</sup> m	<sup>s</sup> s	<sup>°</sup> °	<sup>'</sup> '	<sup>"</sup> "
0	3	45	26	89	N.15	41 37.0
1	3	47	27	10	15	49 49.8
2	3	49	27	53	15	57 58.7
3	3	51	28	18	16	6 3.7
4	3	53	29	04	16	14 4.7
5	3	55	30	12	16	22 1.6
6	3	57	31	42	16	29 54.4
7	3	59	32	94	16	37 43.1
8	4	1	34	68	16	45 27.5
9	4	3	36	64	16	53 7.8
10	4	5	38	82	17	0 43.8
11	4	7	41	23	17	8 15.4
12	4	9	43	85	17	15 42.6
13	4	11	46	70	17	23 5.4
14	4	13	49	78	17	30 23.8
15	4	15	53	08	17	37 37.6
16	4	17	56	60	17	44 46.8
17	4	20	0	35	17	51 51.5
18	4	22	4	32	17	58 51.5
19	4	24	8	52	18	5 46.8
20	4	26	12	94	18	12 37.3
21	4	28	17	59	18	19 23.0
22	4	30	22	46	18	26 3.9
23	4	32	27	56	N.18	32 39.9

## MONDAY 30.

	<sup>h</sup> h	<sup>m</sup> m	<sup>s</sup> s	<sup>°</sup> °	<sup>'</sup> '	<sup>"</sup> "
0	4	34	32	89	N.18	39 10.9
1	4	36	38	44	18	45 37.0
2	4	38	44	21	18	51 58.0
3	4	40	50	20	18	58 14.0
4	4	42	56	42	19	4 24.9
5	4	45	2	85	19	10 30.6
6	4	47	9	51	19	16 31.1
7	4	49	16	39	19	22 26.3
8	4	51	23	50	19	28 16.2
9	4	53	30	82	19	34 0.8
10	4	55	38	35	19	39 40.0
11	4	57	46	11	19	45 13.8
12	4	59	54	08	19	50 42.1
13	5	2	2	27	19	56 4.9
14	5	4	10	67	20	1 22.1
15	5	6	19	29	20	6 33.7
16	5	8	28	12	20	11 39.7
17	5	10	37	16	20	16 40.0
18	5	12	46	41	20	21 34.5
19	5	14	55	87	20	26 23.2
20	5	17	5	54	20	31 6.2
21	5	19	15	41	20	35 43.3
22	5	21	25	48	20	40 14.5
23	5	23	35	76	20	44 39.7
24	5	25	46	23	N.20	48 59.0

## TUESDAY 31.

	<sup>h</sup> h	<sup>m</sup> m	<sup>s</sup> s	<sup>°</sup> °	<sup>'</sup> '	<sup>"</sup> "
0	5	25	46	23	N.20	48 59.0
1	5	27	56	90	20	53 12.3
2	5	30	7	77	20	57 19.5
3	5	32	18	83	21	1 20.6
4	5	34	30	08	21	5 15.6
5	5	36	41	52	21	9 4.5
6	5	38	53	15	21	12 47.1
7	5	41	4	07	21	16 23.5
8	5	43	16	97	21	19 53.6
9	5	45	29	15	21	23 17.4
10	5	47	41	51	21	26 34.9
11	5	49	54	05	21	29 46.0
12	5	52	6	76	21	32 50.6
13	5	54	19	65	21	35 48.8
14	5	56	32	70	21	38 40.6
15	5	58	45	92	21	41 25.8
16	6	0	59	31	21	44 4.5
17	6	3	12	86	21	46 36.7
18	6	5	26	56	21	49 2.2
19	6	7	40	42	21	51 21.1
20	6	9	54	44	21	53 33.3
21	6	12	8	60	21	55 38.8
22	6	14	22	91	21	57 37.6
23	6	16	37	37	N.21	59 29.7

## WEDNESDAY, JUNE 1.

	<sup>h</sup> h	<sup>m</sup> m	<sup>s</sup> s	<sup>°</sup> °	<sup>'</sup> '	<sup>"</sup> "
0	6	18	51	96	N.22	1 15.0

## PHASES OF THE MOON.

		<sup>h</sup> h	<sup>m</sup> m
May 8	☾ First Quarter	3	37.7
14	☉ Full Moon	18	3.4
21	☾ Last Quarter	18	9.2
29	● New Moon	20	57.0

		<sup>h</sup> h
May 13	☾ Perigee	21
26	☾ Apogee	9



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
3	SUN W.	30 8 23	3389	31 30 52	3378	32 53 33	3367	34 16 27	3356
	Pollux E.	39 46 50	3043	38 17 30	3042	36 48 10	3041	35 18 48	3042
	Regulus E.	75 16 1	2973	73 45 15	2966	72 14 20	2961	70 43 18	2954
4	SUN W.	41 14 2	3304	42 38 9	3293	44 2 29	3282	45 27 1	3272
	Pollux E.	27 52 22	3057	26 23 19	3066	24 54 27	3077	23 25 49	3092
	Regulus E.	63 5 55	2918	61 33 59	2909	60 1 52	2902	58 29 35	2894
	Spica E.	116 55 57	2954	115 24 46	2945	113 53 24	2935	112 21 50	2926
5	SUN W.	52 32 53	3216	53 58 43	3204	55 24 47	3192	56 51 6	3180
	Regulus E.	50 45 26	2848	49 12 1	2838	47 38 23	2829	46 4 33	2819
	Spica E.	104 40 57	2877	103 8 9	2866	101 35 6	2856	100 1 51	2845
6	SUN W.	64 6 22	3116	65 34 12	3102	67 2 19	3089	68 30 42	3075
	Regulus E.	38 12 1	2766	36 36 49	2755	35 1 22	2744	33 25 40	2732
	Spica E.	92 11 57	2788	90 37 13	2776	89 2 13	2763	87 26 57	2751
7	SUN W.	75 57 1	3002	77 27 12	2986	78 57 42	2971	80 28 31	2955
	Regulus E.	25 23 25	2677	23 46 14	2666	22 8 49	2657	20 31 11	2648
	Spica E.	79 26 27	2686	77 49 29	2672	76 12 12	2659	74 34 37	2646
	Antares E.	125 16 45	2714	123 40 24	2698	122 3 42	2682	120 26 38	2666
8	SUN W.	88 7 39	2873	89 40 32	2857	91 13 46	2841	92 47 21	2824
	Pollux W.	24 42 31	2697	26 19 15	2663	27 56 45	2632	29 34 56	2604
	Spica E.	66 21 59	2575	64 42 30	2561	63 2 41	2546	61 22 32	2532
	Antares E.	112 15 46	2583	110 36 28	2567	108 56 48	2551	107 16 45	2535
9	SUN W.	100 40 50	2738	102 16 40	2721	103 52 52	2704	105 29 27	2687
	Pollux W.	37 54 51	2483	39 36 28	2462	41 18 35	2442	43 1 10	2421
	Spica E.	52 56 52	2462	51 14 46	2449	49 32 21	2436	47 49 38	2423
	Antares E.	98 50 46	2452	97 8 25	2435	95 25 40	2419	93 42 33	2403
	Saturn E.	118 16 45	2393	116 33 0	2377	114 48 52	2362	113 4 22	2345
10	SUN W.	113 38 4	2602	115 16 56	2586	116 56 10	2571	118 35 45	2555
	Pollux W.	51 41 9	2327	53 26 29	2310	55 12 14	2292	56 58 25	2276
	Regulus W.	15 39 9	2335	17 24 17	2310	19 10 1	2287	20 56 19	2267
	Spica E.	39 11 46	2369	37 27 27	2361	35 42 56	2355	33 58 16	2350
	Antares E.	85 1 10	2324	83 15 45	2309	81 29 58	2294	79 43 49	2280
	Saturn E.	104 16 1	2266	102 29 11	2251	100 41 59	2235	98 54 23	2220
11	SUN W.	126 59 2	2481	128 40 42	2467	130 22 42	2455	132 4 59	2442
	Pollux W.	65 55 19	2197	67 43 51	2184	69 32 43	2169	71 21 57	2156
	Regulus W.	29 54 52	2180	31 43 50	2165	33 33 10	2150	35 22 53	2137
	Spica E.	25 14 22	2368	23 30 2	2388	21 46 10	2417	20 2 59	2458
	Antares E.	70 47 53	2212	68 59 43	2199	67 11 14	2188	65 22 28	2177
	Saturn E.	89 50 56	2148	88 1 10	2135	86 11 4	2122	84 20 38	2109
	α Aquilæ E.	115 6 11	2938	113 34 41	2904	112 2 27	2872	110 29 32	2842
12	Pollux W.	80 32 53	2097	82 23 56	2088	84 15 14	2078	86 6 47	2069
	Regulus W.	44 36 22	2076	46 27 58	2066	48 19 49	2057	50 11 55	2048
	Antares E.	56 14 45	2131	54 24 33	2124	52 34 11	2118	50 43 40	2114
	Saturn E.	75 3 53	2053	73 11 41	2044	71 19 15	2034	69 26 34	2026
	α Aquilæ E.	102 36 5	2722	100 59 55	2704	99 23 21	2689	97 46 26	2675
13	Pollux W.	95 27 32	2036	97 20 10	2032	99 12 54	2028	101 5 44	2025



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
3	SUN W.	35 39 34	3345	37 2 53	3335	38 26 24	3325	39 50 7	3314
	Pollux E.	33 49 27	3042	32 20 6	3044	30 50 47	3047	29 21 32	3051
	Regulus E.	69 12 7	2947	67 40 48	2939	66 9 19	2933	64 37 42	2925
4	SUN W.	46 51 45	3261	48 16 42	3249	49 41 53	3239	51 7 16	3227
	Pollux E.	21 57 29	3113	20 29 35	3140	19 2 14	3177	17 35 37	3226
	Regulus E.	56 57 8	2884	55 24 29	2876	53 51 40	2867	52 18 39	2858
	Spica E.	110 50 4	2916	109 18 6	2906	107 45 55	2897	106 13 33	2887
5	SUN W.	58 17 39	3167	59 44 27	3155	61 11 30	3143	62 38 48	3129
	Regulus E.	44 30 30	2808	42 56 13	2798	41 21 43	2788	39 46 59	2777
	Spica E.	98 28 21	2834	96 54 37	2822	95 20 38	2811	93 46 25	2800
6	SUN W.	69 59 22	3061	71 28 20	3047	72 57 35	3031	74 27 9	3017
	Regulus E.	31 49 43	2721	30 13 31	2710	28 37 4	2698	27 0 22	2687
	Spica E.	85 51 25	2738	84 15 36	2726	82 39 31	2713	81 3 8	2699
7	SUN W.	81 59 40	2939	83 31 9	2923	85 2 58	2907	86 35 8	2890
	Regulus E.	18 53 21	2640	17 15 20	2635	15 37 12	2634	13 59 3	2636
	Spica E.	72 56 44	2631	71 18 31	2618	69 40 0	2603	68 1 9	2589
	Antares E.	118 49 12	2649	117 11 24	2632	115 33 13	2617	113 54 41	2600
8	SUN W.	94 21 18	2806	95 55 38	2790	97 30 19	2772	99 5 23	2755
	Pollux W.	31 13 45	2577	32 53 11	2552	34 33 12	2529	36 13 45	2505
	Spica E.	59 42 3	2518	58 1 15	2504	56 20 7	2490	54 38 39	2476
	Antares E.	105 36 20	2517	103 55 31	2501	102 14 19	2484	100 32 44	2468
9	SUN W.	107 6 24	2669	108 43 45	2652	110 21 29	2636	111 59 35	2619
	Pollux W.	44 44 15	2401	46 27 48	2382	48 11 48	2364	49 56 15	2345
	Spica E.	46 6 36	2411	44 23 17	2400	42 39 42	2389	40 55 51	2379
	Antares E.	91 59 2	2387	90 15 8	2371	88 30 51	2355	86 46 12	2339
	Saturn E.	111 19 28	2329	109 34 11	2313	107 48 31	2297	106 2 27	2282
10	SUN W.	120 15 42	2539	121 56 2	2524	123 36 42	2509	125 17 42	2495
	Pollux W.	58 45 0	2259	60 32 0	2243	62 19 24	2228	64 7 10	2212
	Regulus W.	22 43 7	2248	24 30 24	2229	26 18 8	2212	28 6 18	2196
	Spica E.	32 13 29	2347	30 28 38	2347	28 43 47	2349	26 58 59	2356
	Antares E.	77 57 20	2265	76 10 28	2251	74 23 17	2237	72 35 45	2224
	Saturn E.	97 6 26	2205	95 18 6	2190	93 29 24	2176	91 40 20	2163
11	SUN W.	133 47 34	2430	135 30 26	2419	137 13 33	2409	138 56 55	2399
	Pollux W.	73 11 31	2143	75 1 24	2131	76 51 36	2119	78 42 6	2108
	Regulus W.	37 12 56	2123	39 3 20	2111	40 54 3	2099	42 45 4	2088
	Spica E.	18 20 46	2517	16 39 56	2603	15 1 5	2730	13 25 5	2921
	Antares E.	63 33 25	2166	61 44 6	2156	59 54 32	2147	58 4 45	2139
	Saturn E.	82 29 53	2097	80 38 50	2085	78 47 28	2074	76 55 49	2063
	α Aquilæ E.	108 55 58	2814	107 21 48	2788	105 47 4	2764	104 11 49	2742
12	Pollux W.	87 58 34	2062	89 50 32	2054	91 42 42	2047	93 35 3	2042
	Regulus W.	52 4 15	2039	53 56 48	2032	55 49 33	2025	57 42 29	2019
	Antares E.	48 53 2	2110	47 2 18	2108	45 11 31	2106	43 20 41	2107
	Saturn E.	67 33 40	2018	65 40 33	2010	63 47 15	2003	61 53 46	1998
	α Aquilæ E.	96 9 12	2662	94 31 41	2652	92 53 56	2643	91 15 59	2636
13	Pollux W.	102 58 39	2024	104 51 36	2022	106 44 36	2022	108 37 36	2023



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
13	Regulus W.	59 35 34	2013	61 28 48	2008	63 22 9	2004	65 15 37	2000
	Antares E.	41 29 53	2109	39 39 7	2113	37 48 28	2119	35 57 57	2127
	Saturn E.	60 0 9	1992	58 6 22	1988	56 12 29	1984	54 18 29	1981
	$\alpha$ Aquilæ E.	89 37 53	2631	87 59 40	2628	86 21 23	2627	84 43 5	2627
	Fomalhaut E.	123 54 50	2315	122 9 12	2298	120 23 9	2283	118 36 44	2269
14	Pollux W.	110 30 35	2024	112 23 32	2026	114 16 26	2029	116 9 15	2033
	Regulus W.	74 43 53	1995	76 37 35	1996	78 31 15	1998	80 24 52	2001
	Spica W.	21 45 56	2228	23 33 42	2196	25 22 15	2171	27 11 26	2153
	Antares E.	26 50 7	2222	25 2 12	2259	23 15 12	2306	21 29 21	2365
	Saturn E.	44 47 37	1976	42 53 24	1977	40 59 14	1979	39 5 7	1982
	$\alpha$ Aquilæ E.	76 32 41	2662	74 55 10	2675	73 17 57	2691	71 41 5	2710
	Fomalhaut E.	109 40 32	2228	107 52 46	2224	106 4 54	2221	104 16 58	2220
	$\alpha$ Pegasi E.	124 17 27	2571	122 37 52	2547	120 57 44	2528	119 17 10	2512
15	Regulus W.	89 51 28	2026	91 44 21	2034	93 37 3	2042	95 29 32	2050
	Spica W.	36 22 20	2114	38 12 57	2114	40 3 34	2116	41 54 8	2119
	Saturn E.	29 36 1	2007	27 42 38	2015	25 49 27	2023	23 56 28	2032
	$\alpha$ Aquilæ E.	63 44 4	2845	62 10 34	2881	60 37 50	2921	59 5 57	2965
	Fomalhaut E.	95 17 34	2264	93 29 57	2241	91 42 30	2248	89 55 14	2256
	$\alpha$ Pegasi E.	110 49 43	2466	109 7 42	2463	107 25 37	2462	105 43 30	2463
	Venus E.	130 47 19	2344	129 2 23	2351	127 17 38	2359	125 33 4	2368
16	Regulus W.	104 48 17	2104	106 39 10	2117	108 29 44	2130	110 19 58	2143
	Spica W.	51 5 9	2153	52 54 47	2163	54 44 10	2174	56 33 16	2186
	$\alpha$ Aquilæ E.	51 42 16	2360	50 17 18	2338	48 53 50	2343	47 31 59	2316
	Fomalhaut E.	81 2 36	2316	79 17 0	2331	77 31 46	2348	75 46 56	2365
	$\alpha$ Pegasi E.	97 14 4	2492	95 32 39	2502	93 51 28	2513	92 10 33	2526
	Venus E.	116 53 51	2424	115 10 51	2437	113 28 9	2451	111 45 47	2465
17	Spica W.	65 34 9	2254	67 21 17	2269	69 8 2	2285	70 54 24	2300
	Antares W.	20 35 31	2553	22 15 30	2522	23 56 13	2500	25 37 27	2485
	Fomalhaut E.	67 9 24	2467	65 27 24	2490	63 45 57	2515	62 5 4	2541
	$\alpha$ Pegasi E.	83 50 57	2607	82 12 12	2627	80 33 54	2648	78 56 4	2670
	Venus E.	103 19 18	2547	101 39 10	2564	99 59 26	2582	98 20 6	2601
18	Spica W.	79 40 10	2387	81 24 3	2405	83 7 30	2424	84 50 31	2442
	Antares W.	34 6 6	2484	35 47 41	2492	37 29 5	2501	39 10 17	2512
	Fomalhaut E.	53 50 14	2691	52 13 22	2726	50 37 17	2763	49 2 0	2801
	$\alpha$ Pegasi E.	70 54 48	2796	69 20 15	2826	67 46 21	2856	66 13 5	2887
	Venus E.	90 9 54	2697	88 33 10	2718	86 56 54	2738	85 21 4	2758
	Sun E.	135 37 25	2686	134 0 26	2704	132 23 52	2723	130 47 43	2742
19	Spica W.	93 19 1	2536	94 59 25	2556	96 39 21	2574	98 18 51	2593
	Antares W.	47 32 3	2579	49 11 27	2594	50 50 31	2610	52 29 13	2624
	Saturn W.	28 13 43	2484	29 55 18	2503	31 36 27	2522	33 17 10	2540
	Fomalhaut E.	41 19 11	3035	39 49 42	3094	38 21 25	3156	36 54 23	3225
	$\alpha$ Pegasi E.	58 37 19	3065	57 8 27	3106	55 40 24	3149	54 13 14	3194
	Venus E.	77 28 38	2861	75 55 29	2882	74 22 47	2902	72 50 31	2923
	Sun E.	122 53 17	2840	121 19 41	2859	119 46 29	2879	118 13 43	2898
20	Spica W.	106 29 57	2687	108 6 55	2705	109 43 28	2724	111 19 36	2741
	Antares W.	60 37 25	2705	62 13 59	2721	63 50 11	2737	65 26 2	2753



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>a</sup> .	P.L. of diff.	XVIII <sup>a</sup> .	P.L. of diff.	XXI <sup>a</sup> .	P.L. of diff.
13	Regulus W.	67 9 11 1998	69 2 48 1996	70 56 29 1995	72 50 11 1995				
	Antares E.	34 7 39 2138	32 17 37 2152	30 27 57 2170	28 38 45 2193				
	Saturn E.	52 24 24 1978	50 30 15 1976	48 36 3 1975	46 41 50 1975				
	$\alpha$ Aquilæ E.	83 4 47 2630	81 26 33 2635	79 48 25 2642	78 10 27 2651				
	Fomalhaut E.	116 49 59 2257	115 2 57 2247	113 15 40 2239	111 28 11 2233				
14	Pollux W.	118 1 57 2037	119 54 33 2043	121 47 0 2050	123 39 16 2058				
	Regulus W.	82 18 25 2005	84 11 52 2009	86 5 12 2014	87 58 25 2020				
	Spica W.	29 1 5 2139	30 51 5 2129	32 41 21 2122	34 31 47 2117				
	Antares E.	19 44 56 2444	18 2 24 2549	16 22 18 2691	14 45 26 2892				
	Saturn E.	37 11 4 1985	35 17 6 1990	33 23 16 1995	31 29 34 2001				
	$\alpha$ Aquilæ E.	70 4 38 2731	68 28 39 2754	66 53 11 2781	65 18 18 2811				
	Fomalhaut E.	102 29 1 2220	100 41 4 2222	98 53 9 2225	97 5 19 2229				
	$\alpha$ Pegasi E.	117 36 13 2498	115 54 56 2486	114 13 23 2477	112 31 38 2470				
15	Regulus W.	97 21 48 2059	99 13 50 2070	101 5 35 2080	102 57 5 2092				
	Spica W.	43 44 38 2124	45 35 0 2129	47 25 14 2136	49 15 18 2145				
	Saturn E.	22 3 44 2041	20 11 14 2052	18 19 1 2063	16 27 5 2075				
	$\alpha$ Aquilæ E.	57 35 1 3014	56 5 5 3067	54 36 15 3126	53 8 37 3190				
	Fomalhaut E.	88 8 10 2266	86 21 21 2277	84 34 48 2289	82 48 33 2302				
	$\alpha$ Pegasi E.	104 1 25 2466	102 19 24 2470	100 37 28 2476	98 55 41 2483				
	Venus E.	123 48 44 2378	122 4 37 2388	120 20 45 2400	118 37 10 2411				
16	Regulus W.	112 9 52 2158	113 59 23 2172	115 48 33 2188	117 37 19 2203				
	Spica W.	58 22 5 2198	60 10 36 2211	61 58 48 2225	63 46 39 2239				
	$\alpha$ Aquilæ E.	46 11 53 3619	44 53 39 3733	43 37 27 3858	42 23 25 3996				
	Fomalhaut E.	74 2 30 2383	72 18 31 2402	70 34 59 2422	68 51 56 2444				
	$\alpha$ Pegasi E.	90 29 56 2540	88 49 38 2555	87 9 42 2571	85 30 7 2589				
	Venus E.	110 3 45 2481	108 22 5 2497	106 40 47 2512	104 59 51 2529				
17	Spica W.	72 40 23 2317	74 25 57 2335	76 11 6 2351	77 55 51 2369				
	Antares W.	27 19 1 2478	29 0 45 2475	30 42 34 2475	32 24 22 2478				
	Fomalhaut E.	60 24 48 2568	58 45 9 2596	57 6 9 2626	55 27 50 2658				
	$\alpha$ Pegasi E.	77 18 44 2693	75 41 55 2718	74 5 39 2743	72 29 56 2769				
	Venus E.	96 41 12 2619	95 2 43 2638	93 24 40 2658	91 47 4 2677				
18	Spica W.	86 33 6 2460	88 15 15 2479	89 56 57 2499	91 38 12 2517				
	Antares W.	40 51 13 2524	42 31 53 2537	44 12 15 2550	45 52 19 2564				
	Fomalhaut E.	47 27 33 2842	45 54 0 2886	44 21 23 2933	42 49 46 2982				
	$\alpha$ Pegasi E.	64 40 30 2920	63 8 36 2954	61 37 25 2989	60 6 59 3026				
	Venus E.	83 45 41 2778	82 10 44 2799	80 36 15 2820	79 2 13 2841				
	SUN E.	129 11 59 2761	127 36 40 2781	126 1 47 2800	124 27 19 2820				
19	Spica W.	99 57 55 2612	101 36 34 2631	103 14 47 2649	104 52 35 2669				
	Antares W.	54 7 35 2640	55 45 35 2657	57 23 13 2672	59 0 30 2689				
	Saturn W.	34 57 28 2558	36 37 20 2576	38 16 48 2595	39 55 50 2612				
	Fomalhaut E.	35 28 44 3300	34 4 32 3383	32 41 56 3476	31 21 5 3580				
	$\alpha$ Pegasi E.	52 46 57 3241	51 21 36 3290	49 57 13 3343	48 33 52 3400				
	Venus E.	71 18 41 2943	69 47 16 2964	68 16 18 2983	66 45 44 3004				
	SUN E.	116 41 22 2918	115 9 26 2937	113 37 54 2957	112 6 47 2976				
20	Spica W.	112 55 21 2759	114 30 42 2777	116 5 40 2794	117 40 16 2811				
	Antares W.	67 1 32 2768	68 36 42 2784	70 11 31 2799	71 46 0 2814				



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
20	Saturn W.	41 34 29	2630	43 12 43	2648	44 50 33	2665	46 28 0	2682
	α Pegasi E.	47 11 35	3460	45 50 26	3524	44 30 28	3592	43 11 45	3665
	Venus E.	65 15 36	3023	63 45 52	3043	62 16 33	3062	60 47 37	3081
	SUN E.	110 36 4	2994	109 5 44	3013	107 35 48	3032	106 6 15	3051
21	Antares W.	73 20 9	2829	74 53 59	2844	76 27 29	2858	78 0 42	2873
	Saturn W.	54 29 42	2763	56 4 58	2778	57 39 55	2793	59 14 32	2807
	α Aquilæ W.	38 0 22	5044	38 56 43	4903	39 54 55	4780	40 54 48	4671
	α Pegasi E.	36 59 50	4142	35 50 29	4267	34 43 6	4407	33 37 51	4562
	Venus E.	53 28 40	3172	52 1 58	3190	50 35 37	3207	49 9 36	3224
	SUN E.	98 44 0	3138	97 16 36	3153	95 49 31	3170	94 22 46	3186
22	Antares W.	85 42 19	2938	87 13 49	2950	88 45 4	2962	90 16 4	2974
	Saturn W.	67 3 5	2874	68 35 57	2887	70 8 33	2898	71 40 54	2909
	α Aquilæ W.	46 14 31	4279	47 21 43	4224	48 29 47	4174	49 38 38	4128
	Venus E.	42 4 17	3301	40 40 7	3316	39 16 14	3330	37 52 37	3344
	SUN E.	87 13 33	3259	85 48 33	3272	84 23 49	3284	82 59 19	3297
23	Antares W.	97 47 35	3026	99 17 16	3035	100 46 45	3044	102 16 3	3053
	Saturn W.	79 19 13	2960	80 50 16	2969	82 21 8	2977	83 51 49	2985
	α Aquilæ W.	55 32 26	3962	56 44 43	3937	57 57 25	3915	59 10 30	3895
	Venus E.	30 58 23	3408	29 36 15	3420	28 14 21	3432	26 52 41	3444
	SUN E.	76 0 19	3352	74 37 8	3362	73 14 8	3371	71 51 19	3380
24	Antares W.	109 40 4	3090	111 8 26	3096	112 36 40	3103	114 4 46	3109
	Saturn W.	91 22 55	3018	92 52 45	3024	94 22 28	3030	95 52 4	3034
	α Aquilæ W.	65 20 28	3817	66 35 13	3805	67 50 10	3794	69 5 19	3785
	Fomalhaut W.	30 10 44	3982	31 22 41	3912	32 35 49	3849	33 50 1	3793
	SUN E.	64 59 34	3417	63 37 37	3423	62 15 47	3430	60 54 4	3435
25	Saturn W.	103 18 52	3051	104 48 2	3052	106 17 10	3055	107 46 14	3056
	α Aquilæ W.	75 23 19	3746	76 39 18	3740	77 55 23	3734	79 11 34	3729
	Fomalhaut W.	40 13 22	3599	41 31 57	3572	42 51 2	3547	44 10 34	3524
	α Pegasi W.	30 25 36	5191	31 20 4	5014	32 16 48	4860	33 15 35	4724
	SUN E.	54 6 47	3455	52 45 32	3457	51 24 20	3460	50 3 11	3462
26	Saturn W.	115 11 22	3059	116 40 22	3058	118 9 23	3056	119 38 26	3056
	α Aquilæ W.	85 33 36	3712	86 50 10	3710	88 6 47	3708	89 23 26	3707
	Fomalhaut W.	50 53 56	3435	52 15 33	3420	53 37 27	3407	54 59 36	3394
	α Pegasi W.	38 34 37	4234	39 42 31	4164	40 51 31	4100	42 1 33	4041
	SUN E.	43 17 54	3468	41 56 54	3468	40 35 54	3468	39 14 54	3468
27	α Aquilæ W.	95 46 54	3706	97 3 35	3707	98 20 15	3709	99 36 52	3711
	Fomalhaut W.	61 53 46	3339	63 17 13	3329	64 40 51	3319	66 4 41	3310
	α Pegasi W.	48 4 34	3816	49 19 20	3780	50 34 43	3747	51 50 40	3717
	Venus W.	12 44 44	3603	14 3 15	3580	15 22 11	3560	16 41 29	3545
	SUN E.	32 29 47	3464	31 8 43	3463	29 47 38	3462	28 26 32	3462



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
20	Saturn W.	48 5 4	2698	49 41 46	2715	51 18 6	2731	52 54 4	2747
	α Pegasi E.	41 54 21	3745	40 38 22	3832	39 23 53	3927	38 11 0	4030
	Venus E.	59 19 4	3100	57 50 55	3119	56 23 8	3137	54 55 43	3155
	SUN E.	104 37 5	3068	103 8 16	3086	101 39 50	3103	100 11 44	3121
21	Antares W.	79 33 36	2887	81 6 12	2900	82 38 31	2913	84 10 33	2926
	Saturn W.	60 48 51	2821	62 22 51	2835	63 56 33	2849	65 29 57	2862
	α Aquilæ W.	41 56 12	4573	42 59 0	4486	44 3 4	4410	45 8 16	4341
	α Pegasi E.	32 34 53	4735	31 34 23	4929	30 36 31	5150	29 41 32	5402
	Venus E.	47 43 55	3240	46 18 33	3255	44 53 29	3271	43 28 44	3287
	SUN E.	92 56 20	3201	91 30 12	3216	90 4 22	3231	88 38 49	3245
22	Antares W.	91 46 49	2985	93 17 20	2996	94 47 38	3006	96 17 43	3017
	Saturn W.	73 13 1	2921	74 44 53	2931	76 16 33	2942	77 47 59	2951
	α Aquilæ W.	50 48 13	4088	51 58 26	4052	53 9 14	4019	54 20 35	3989
	Venus E.	36 29 16	3358	35 6 11	3370	33 43 20	3383	32 20 44	3396
	SUN E.	81 35 4	3310	80 11 4	3321	78 47 16	3332	77 23 41	3343
23	Antares W.	103 45 10	3061	105 14 8	3069	106 42 56	3077	108 11 34	3083
	Saturn W.	85 22 20	2993	86 52 41	3000	88 22 54	3007	89 52 58	3013
	α Aquilæ W.	60 23 55	3876	61 37 39	3859	62 51 40	3844	64 5 57	3830
	Venus E.	25 31 14	3455	24 10 0	3468	22 49 0	3480	21 28 14	3493
	SUN E.	70 28 40	3388	69 6 10	3397	67 43 50	3404	66 21 38	3411
24	Antares W.	115 32 45	3114	117 0 38	3119	118 28 24	3124	119 56 4	3129
	Saturn W.	97 21 35	3038	98 51 1	3042	100 20 22	3045	101 49 39	3048
	α Aquilæ W.	70 20 37	3775	71 36 5	3766	72 51 42	3759	74 7 27	3752
	Fomalhaut W.	35 5 10	3745	36 21 9	3702	37 37 54	3664	38 55 20	3630
	SUN E.	59 32 27	3439	58 10 55	3444	56 49 28	3447	55 28 5	3452
25	Saturn W.	109 15 17	3057	110 44 19	3058	112 13 20	3058	113 42 21	3058
	α Aquilæ W.	80 27 50	3725	81 44 11	3722	83 0 35	3717	84 17 4	3714
	Fomalhaut W.	45 30 32	3504	46 50 52	3484	48 11 34	3466	49 32 36	3450
	α Pegasi W.	34 16 14	4603	35 18 36	4495	36 22 32	4398	37 27 55	4311
	SUN E.	48 42 4	3464	47 21 0	3465	45 59 57	3466	44 38 55	3467
26	Saturn W.	121 7 29	3054	122 36 35	3052	124 5 43	3051	125 34 53	3048
	α Aquilæ W.	90 40 6	3705	91 56 48	3705	93 13 30	3705	94 30 12	3705
	Fomalhaut W.	56 22 0	3382	57 44 37	3370	59 7 28	3359	60 30 31	3349
	α Pegasi W.	43 12 32	3988	44 24 23	3940	45 37 2	3895	46 50 27	3854
	SUN E.	37 53 54	3467	36 32 53	3467	35 11 52	3466	33 50 50	3465
27	α Aquilæ W.	100 53 27	3714	102 9 59	3718	103 26 27	3723	104 42 50	3728
	Fomalhaut W.	67 28 41	3301	68 52 51	3293	70 17 11	3284	71 41 41	3276
	α Pegasi W.	53 7 9	3689	54 24 8	3662	55 41 36	3636	56 59 31	3612
	Venus W.	18 1 3	3532	19 20 52	3520	20 40 54	3509	22 1 8	3499
	SUN E.	27 5 25	3462	25 44 18	3462	24 23 11	3462	23 2 4	3462



AIRY'S Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
At Mean Midnight,					
Logarithms of				Value of	
E	F	G	H	L	
1°03839	1°06024	0°07529	1°45434	119°213	<sup>h</sup> 21 <sup>m</sup> 19 <sup>s</sup> 38·85
1°04673	1°05038	0°07622	1°45450	119°192	21 15 42·95
1°05506	1°04046	0°07714	1°45466	119°162	21 11 47·04
1°06337	1°03048	0°07808	1°45482	119°121	21 7 51·13
1°07166	1°02044	0°07903	1°45498	119°069	21 3 55·22
1°07993	1°01033	0°07998	1°45514	119°008	20 59 59·31
1°08818	1°00017	0°08095	1°45530	118°935	20 56 3·40
1°09639	0°98998	0°08193	1°45547	118°852	20 52 7·49
1°10456	0°97975	0°08290	1°45563	118°760	20 48 11·58
1°11270	0°96947	0°08389	1°45579	118°658	20 44 15·67
1°12079	0°95916	0°08488	1°45594	118°547	20 40 19·76
1°12885	0°94882	0°08589	1°45609	118°424	20 36 23·85
1°13685	0°93846	0°08691	1°45624	118°292	20 32 27·94
1°14481	0°92808	0°08792	1°45639	118°150	20 28 32·03
1°15271	0°91772	0°08895	1°45653	117°999	20 24 36·12
1°16057	0°90735	0°08999	1°45667	117°838	20 20 40·21
1°16837	0°89700	0°09102	1°45681	117°667	20 16 44·30
1°17610	0°88667	0°09207	1°45694	117°487	20 12 48·39
1°18378	0°87636	0°09312	1°45707	117°298	20 8 52·48
1°19140	0°86610	0°09418	1°45720	117°098	20 4 56·57
1°19897	0°85591	0°09525	1°45732	116°889	20 1 0·66
1°20647-	0°84577	0°09632	1°45744	116°670	19 57 4·75
1°21391	0°83574	0°09740	1°45755	116°442	19 53 8·84
1°22128	0°82578	0°09848	1°45765	116°207	19 49 12·93
1°22858	0°81596	0°09956	1°45775	115°962	19 45 17·01
1°23583	0°80624	0°10066	1°45784	115°707	19 41 21·10
1°24301	0°79666	0°10176	1°45792	115°444	19 37 25·19
1°25013	0°78725	0°10286	1°45800	115°172	19 33 29·29
1°25717	0°77799	0°10397	1°45807	114°892	19 29 33·38
1°26414	0°76894	0°10508	1°45814	114°602	19 25 37·47
1°27104	0°76015	0°10619	1°45820	114°304	19 21 41·56
1°27788	0°75155	0°10732	1°45825	113°996	19 17 45·65



Day of the Month.	BESSEL'S Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .785249. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	—1 <sup>h</sup> .1485	—1 <sup>h</sup> .1307	—8 <sup>h</sup> .0290	+0 <sup>h</sup> .5399	2404184	39	120	.3285
2	1 <sup>h</sup> .1419	1 <sup>h</sup> .1389	7 <sup>h</sup> .9122	0 <sup>h</sup> .5412	2404185	40	121	.3313
3	1 <sup>h</sup> .1351	1 <sup>h</sup> .1469	7 <sup>h</sup> .7497	0 <sup>h</sup> .5426	2404186	41	122	.3340
4	—1 <sup>h</sup> .1280	—1 <sup>h</sup> .1545	—7 <sup>h</sup> .4814	+0 <sup>h</sup> .5439	2404187	42	123	.3368
5	1 <sup>h</sup> .1208	1 <sup>h</sup> .1619	—6 <sup>h</sup> .6233	0 <sup>h</sup> .5452	2404188	43	124	.3395
6	1 <sup>h</sup> .1132	1 <sup>h</sup> .1691	+7 <sup>h</sup> .3464	0 <sup>h</sup> .5465	2404189	44	125	.3422
7	—1 <sup>h</sup> .1055	—1 <sup>h</sup> .1760	+7 <sup>h</sup> .6893	+0 <sup>h</sup> .5478	2404190	45	126	.3450
8	1 <sup>h</sup> .0974	1 <sup>h</sup> .1826	7 <sup>h</sup> .8802	0 <sup>h</sup> .5491	2404191	46	127	.3477
9	1 <sup>h</sup> .0891	1 <sup>h</sup> .1891	8 <sup>h</sup> .0137	0 <sup>h</sup> .5504	2404192	47	128	.3504
10	—1 <sup>h</sup> .0805	—1 <sup>h</sup> .1953	+8 <sup>h</sup> .1163	+0 <sup>h</sup> .5516	2404193	48	129	.3532
11	1 <sup>h</sup> .0716	1 <sup>h</sup> .2013	8 <sup>h</sup> .2003	0 <sup>h</sup> .5529	2404194	49	130	.3559
12	1 <sup>h</sup> .0624	1 <sup>h</sup> .2072	8 <sup>h</sup> .2714	0 <sup>h</sup> .5541	2404195	50	131	.3587
13	—1 <sup>h</sup> .0529	—1 <sup>h</sup> .2128	+8 <sup>h</sup> .3330	+0 <sup>h</sup> .5553	2404196	51	132	.3614
14	1 <sup>h</sup> .0431	1 <sup>h</sup> .2182	8 <sup>h</sup> .3874	0 <sup>h</sup> .5565	2404197	52	133	.3641
15	1 <sup>h</sup> .0329	1 <sup>h</sup> .2234	8 <sup>h</sup> .4362	0 <sup>h</sup> .5576	2404198	53	134	.3669
16	—1 <sup>h</sup> .0223	—1 <sup>h</sup> .2284	+8 <sup>h</sup> .4803	+0 <sup>h</sup> .5587	2404199	54	135	.3696
17	1 <sup>h</sup> .0113	1 <sup>h</sup> .2333	8 <sup>h</sup> .5206	0 <sup>h</sup> .5598	2404200	55	136	.3724
18	1 <sup>h</sup> .0000	1 <sup>h</sup> .2380	8 <sup>h</sup> .5579	0 <sup>h</sup> .5609	2404201	56	137	.3751
19	—0 <sup>h</sup> .9882	—1 <sup>h</sup> .2425	+8 <sup>h</sup> .5926	+0 <sup>h</sup> .5619	2404202	57	138	.3778
20	0 <sup>h</sup> .9760	1 <sup>h</sup> .2468	8 <sup>h</sup> .6251	0 <sup>h</sup> .5629	2404203	58	139	.3806
21	0 <sup>h</sup> .9633	1 <sup>h</sup> .2510	8 <sup>h</sup> .6555	0 <sup>h</sup> .5638	2404204	59	140	.3833
22	—0 <sup>h</sup> .9500	—1 <sup>h</sup> .2550	+8 <sup>h</sup> .6840	+0 <sup>h</sup> .5647	2404205	60	141	.3860
23	0 <sup>h</sup> .9363	1 <sup>h</sup> .2589	8 <sup>h</sup> .7111	0 <sup>h</sup> .5656	2404206	61	142	.3888
24	0 <sup>h</sup> .9219	1 <sup>h</sup> .2626	8 <sup>h</sup> .7366	0 <sup>h</sup> .5664	2404207	62	143	.3915
25	—0 <sup>h</sup> .9070	—1 <sup>h</sup> .2661	+8 <sup>h</sup> .7609	+0 <sup>h</sup> .5672	2404208	63	144	.3943
26	0 <sup>h</sup> .8914	1 <sup>h</sup> .2695	8 <sup>h</sup> .7841	0 <sup>h</sup> .5679	2404209	64	145	.3970
27	0 <sup>h</sup> .8751	1 <sup>h</sup> .2727	8 <sup>h</sup> .8063	0 <sup>h</sup> .5685	2404210	65	146	.3997
28	—0 <sup>h</sup> .8581	—1 <sup>h</sup> .2758	+8 <sup>h</sup> .8276	+0 <sup>h</sup> .5692	2404211	66	147	.4025
29	0 <sup>h</sup> .8402	1 <sup>h</sup> .2788	8 <sup>h</sup> .8480	0 <sup>h</sup> .5697	2404212	67	148	.4052
30	0 <sup>h</sup> .8214	1 <sup>h</sup> .2816	8 <sup>h</sup> .8676	0 <sup>h</sup> .5702	2404213	68	149	.4079
31	0 <sup>h</sup> .8017	1 <sup>h</sup> .2843	8 <sup>h</sup> .8865	0 <sup>h</sup> .5707	2404214	69	150	.4107
32	—0 <sup>h</sup> .7809	—1 <sup>h</sup> .2868	+8 <sup>h</sup> .9046	+0 <sup>h</sup> .5711	2404215	70	151	.4134

\* Add .0026 if Fraction be required for the time 4, see page 329.

\* Add .0026 if Fraction be required for the time  $t$ , see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiameter. passing the Meridian.*	Equation of Time, to be <u>subt. from</u> <u>added to</u> Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Wed.	1	4 36 34.05	10.235	N.22 4 11.1	20.37	1 8.40	2 29.71	0.377
Thur.	2	4 40 39.88	10.251	22 12 8.6	19.41	1 8.46	2 20.46	0.393
Frid.	3	4 44 46.10	10.266	22 19 42.8	18.44	1 8.51	2 10.83	0.409
Sat.	4	4 48 52.66	10.280	22 26 53.5	17.48	1 8.56	2 0.85	0.423
Sun.	5	4 52 59.54	10.293	22 33 40.7	16.47	1 8.61	1 50.55	0.436
Mon.	6	4 57 6.74	10.306	22 40 4.2	15.48	1 8.65	1 39.93	0.448
Tues.	7	5 1 14.23	10.318	22 46 3.7	14.48	1 8.70	1 29.03	0.460
Wed.	8	5 5 22.00	10.329	22 51 39.3	13.48	1 8.74	1 17.86	0.471
Thur.	9	5 9 30.01	10.339	22 56 50.7	12.47	1 8.78	1 6.43	0.481
Frid.	10	5 13 38.26	10.348	23 1 37.9	11.46	1 8.81	0 54.77	0.490
Sat.	11	5 17 46.72	10.357	23 6 0.6	10.45	1 8.84	0 42.90	0.499
Sun.	12	5 21 55.39	10.365	23 9 59.0	9.43	1 8.86	0 30.82	0.507
Mon.	13	5 26 4.24	10.372	23 13 33.0	8.40	1 8.89	0 18.56	0.514
Tues.	14	5 30 13.25	10.379	23 16 42.4	7.38	1 8.91	0 6.14	0.521
Wed.	15	5 34 22.42	10.385	23 19 27.2	6.36	1 8.93	0 6.43	0.526
Thur.	16	5 38 31.71	10.389	23 21 47.4	5.33	1 8.94	0 19.13	0.531
Frid.	17	5 42 41.10	10.392	23 23 42.9	4.30	1 8.95	0 31.94	0.535
Sat.	18	5 46 50.58	10.396	23 25 13.7	3.27	1 8.96	0 44.82	0.538
Sun.	19	5 51 0.12	10.399	23 26 19.7	2.24	1 8.97	0 57.77	0.540
Mon.	20	5 55 9.71	10.400	23 27 0.9	1.20	1 8.97	1 10.76	0.542
Tues.	21	5 59 19.32	10.400	23 27 17.3	0.17	1 8.96	1 23.78	0.543
Wed.	22	6 3 28.93	10.400	23 27 9.0	0.86	1 8.96	1 36.80	0.542
Thur.	23	6 7 38.51	10.399	23 26 35.8	1.90	1 8.95	1 49.78	0.540
Frid.	24	6 11 48.04	10.396	23 25 37.8	2.93	1 8.94	2 2.72	0.537
Sat.	25	6 15 57.50	10.392	23 24 15.1	3.96	1 8.93	2 15.58	0.534
Sun.	26	6 20 6.84	10.386	23 22 27.7	4.99	1 8.91	2 28.33	0.529
Mon.	27	6 24 16.05	10.381	23 20 15.6	6.02	1 8.89	2 40.95	0.523
Tues.	28	6 28 25.12	10.374	23 17 38.9	7.04	1 8.86	2 53.42	0.516
Wed.	29	6 32 34.00	10.365	23 14 37.8	8.06	1 8.83	3 5.71	0.507
Thur.	30	6 36 42.66	10.356	23 11 12.1	9.08	1 8.80	3 17.79	0.498
Frid.	31	6 40 51.08	10.345	N.23 7 22.1	10.09	1 8.77	3 29.62	0.488

\* Mean Time of the Semidiameter passing may be found by subtracting 0<sup>s</sup>.19 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to subt. from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
Wed.	1	<sup>h</sup> 4 <sup>m</sup> 36 <sup>s</sup> 34.47	N.22 4 12.0	15 48.1	<sup>m</sup> 2 29.69	<sup>h</sup> 4 39 4.16
Thur.	2	4 40 40.28	22 12 9.3	15 48.0	2 20.44	4 43 0.72
Frid.	3	4 44 46.47	22 19 43.4	15 47.9	2 10.81	4 46 57.28
Sat.	4	4 48 53.00	22 26 54.1	15 47.8	2 0.83	4 50 53.83
Sun.	5	4 52 59.86	22 33 41.2	15 47.6	1 50.53	4 54 50.39
Mon.	6	4 57 7.03	22 40 4.6	15 47.5	1 39.92	4 58 46.95
Tues.	7	5 1 14.49	22 46 4.1	15 47.4	1 29.02	5 2 43.51
Wed.	8	5 5 22.22	22 51 39.6	15 47.3	1 17.85	5 6 40.07
Thur.	9	5 9 30.20	22 56 50.9	15 47.2	1 6.42	5 10 36.62
Frid.	10	5 13 38.42	23 1 38.0	15 47.1	0 54.76	5 14 33.18
Sat.	11	5 17 46.85	23 6 0.8	15 47.0	0 42.89	5 18 29.74
Sun.	12	5 21 55.48	23 9 59.1	15 46.9	0 30.81	5 22 26.29
Mon.	13	5 26 4.29	23 13 33.0	15 46.9	0 18.56	5 26 22.85
Tues.	14	5 30 13.27	23 16 42.4	15 46.8	0 6.14	5 30 19.41
Wed.	15	5 34 22.40	23 19 27.2	15 46.7	0 6.43	5 34 15.97
Thur.	16	5 38 31.65	23 21 47.4	15 46.6	0 19.13	5 38 12.52
Frid.	17	5 42 41.01	23 23 42.9	15 46.5	0 31.93	5 42 9.08
Sat.	18	5 46 50.45	23 25 13.7	15 46.5	0 44.81	5 46 5.64
Sun.	19	5 50 59.96	23 26 19.7	15 46.4	0 57.76	5 50 2.20
Mon.	20	5 55 9.51	23 27 0.9	15 46.4	1 10.75	5 53 58.76
Tues.	21	5 59 19.08	23 27 17.3	15 46.3	1 23.77	5 57 55.31
Wed.	22	6 3 28.65	23 27 9.0	15 46.2	1 36.78	6 1 51.87
Thur.	23	6 7 38.19	23 26 35.8	15 46.2	1 49.76	6 5 48.43
Frid.	24	6 11 47.68	23 25 37.9	15 46.1	2 2.70	6 9 44.98
Sat.	25	6 15 57.10	23 24 15.2	15 46.1	2 15.56	6 13 41.54
Sun.	26	6 20 6.41	23 22 27.9	15 46.1	2 28.31	6 17 38.10
Mon.	27	6 24 15.59	23 20 15.9	15 46.0	2 40.93	6 21 34.66
Tues.	28	6 28 24.62	23 17 39.3	15 46.0	2 53.40	6 25 31.22
Wed.	29	6 32 33.46	23 14 38.2	15 46.0	3 5.68	6 29 27.78
Thur.	30	6 36 42.09	23 11 12.6	15 46.0	3 17.76	6 33 24.33
Frid.	31	6 40 50.48	N.23 7 22.7	15 46.0	3 29.59	6 37 20.89

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	70° 44' 5".8	S. 0° 51'	0.0062262	15' 8".8	15 12.6	55 29.6	55 43.7
2	71 41 34.4	0° 40'	0.0062854	15 16.7	15 20.9	55 58.4	56 13.9
3	72 39 1.8	0° 27'	0.0063423	15 25.3	15 29.9	56 30.2	56 47.1
4	73 36 28.1	0° 15'	0.0063970	15 34.7	15 39.7	57 4.7	57 22.9
5	74 33 53.2	S. 0° 03'	0.0064496	15 44.8	15 50.0	57 41.6	58 0.6
6	75 31 17.0	N. 0° 08'	0.0065000	15 55.3	16 0.5	58 19.9	58 39.1
7	76 28 39.7	0° 16'	0.0065485	16 5.7	16 10.7	58 58.0	59 16.3
8	77 26 1.3	0° 21'	0.0065953	16 15.4	16 19.7	59 33.5	59 49.3
9	78 23 21.8	0° 23'	0.0066404	16 23.5	16 26.6	60 3.2	60 14.8
10	79 20 41.4	0° 22'	0.0066840	16 29.0	16 30.6	60 23.6	60 29.2
11	80 18 0.1	0° 16'	0.0067262	16 31.2	16 30.8	60 31.4	60 29.9
12	81 15 18.0	N. 0° 08'	0.0067671	16 29.3	16 26.8	60 24.6	60 15.5
13	82 12 35.2	S. 0° 03'	0.0068067	16 23.3	16 18.9	60 2.7	59 46.6
14	83 9 51.8	0° 15'	0.0068450	16 13.7	16 7.8	59 27.4	59 5.8
15	84 7 7.8	0° 27'	0.0068820	16 1.4	15 54.6	58 42.2	58 17.2
16	85 4 23.4	0° 40'	0.0069176	15 47.5	15 40.3	57 51.3	57 25.2
17	86 1 38.6	0° 52'	0.0069517	15 33.3	15 26.5	56 59.4	56 34.3
18	86 58 53.5	0° 63'	0.0069842	15 20.0	15 13.9	56 10.5	55 48.2
19	87 56 8.1	0° 71'	0.0070150	15 8.3	15 3.2	55 27.6	55 9.1
20	88 53 22.6	0° 78'	0.0070440	14 58.8	14 55.1	54 53.0	54 39.3
21	89 50 37.0	0° 82'	0.0070710	14 52.0	14 49.6	54 28.1	54 19.4
22	90 47 51.2	0° 83'	0.0070959	14 48.0	14 47.0	54 13.3	54 9.7
23	91 45 5.4	0° 82'	0.0071186	14 46.7	14 47.0	54 8.5	54 9.7
24	92 42 19.6	0° 79'	0.0071391	14 47.9	14 49.4	54 13.1	54 18.5
25	93 39 33.7	0° 74'	0.0071572	14 51.4	14 53.8	54 25.8	54 34.8
26	94 36 47.7	0° 66'	0.0071728	14 56.7	14 59.9	54 45.3	54 57.1
27	95 34 1.7	0° 56'	0.0071859	15 3.4	15 7.2	55 10.0	55 23.8
28	96 31 15.6	0° 44'	0.0071965	15 11.2	15 15.3	55 38.3	55 53.3
29	97 28 29.4	0° 32'	0.0072045	15 19.4	15 23.6	56 8.6	56 24.0
30	98 25 43.0	0° 20'	0.0072098	15 27.9	15 32.1	56 39.5	56 54.8
31	99 22 56.5	S. 0° 07'	0.0072125	15 36.2	15 40.2	57 9.9	57 24.7



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	THE MOON'S					
		Longitude.		Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>d</sup>	<sup>h</sup> <sup>m</sup>
Wed.	1	94 22 22.7	100 37 29.0	S. 1 21 45.4	S. 0 48 33.8	2.1	1 43.4
Thur.	2	106 55 24.8	113 16 23.5	S. 0 14 29.4	N. 0 20 4.3	3.1	2 35.8
Frid.	3	119 40 39.4	126 8 27.5	N. 0 54 42.2	1 28 58.7	4.1	3 28.7
Sat.	4	132 40 3.3	139 15 42.9	2 2 26.8	2 34 38.7	5.1	4 21.2
Sun.	5	145 55 41.0	152 40 11.3	3 5 6.5	3 33 21.6	6.1	5 13.0
Mon.	6	159 29 25.1	166 23 29.9	3 58 55.5	4 21 20.5	7.1	6 3.9
Tues.	7	173 22 29.0	180 26 19.3	4 40 9.8	4 54 58.4	8.1	6 54.4
Wed.	8	187 34 51.3	194 47 47.8	5 5 24.1	5 11 7.9	9.1	7 45.1
Thur.	9	202 4 42.9	209 25 2.5	5 11 55.8	5 7 39.1	10.1	8 36.9
Frid.	10	216 48 4.1	224 12 58.1	4 58 15.7	4 43 50.9	11.1	9 30.7
Sat.	11	231 38 49.1	239 4 37.6	4 24 37.5	4 0 55.6	12.1	10 27.0
Sun.	12	246 29 22.6	253 52 3.5	3 33 12.6	3 2 1.8	13.1	11 25.8
Mon.	13	261 11 43.4	268 27 29.6	2 28 1.3	1 51 52.2	14.1	12 26.1
Tues.	14	275 38 37.5	282 44 29.8	N. 1 14 16.8	N. 0 35 57.3	15.1	13 26.3
Wed.	15	289 44 38.3	296 38 44.2	S. 0 2 26.0	S. 0 40 15.8	16.1	14 24.5
Thur.	16	303 26 37.6	310 8 17.0	1 16 58.3	1 52 4.1	17.1	15 19.4
Frid.	17	316 43 48.8	323 13 26.5	2 25 8.2	2 55 50.0	18.1	16 10.5
Sat.	18	329 37 29.2	335 56 20.2	3 23 52.4	3 49 2.6	19.1	16 57.8
Sun.	19	342 10 27.5	348 20 21.7	4 11 10.1	4 30 7.2	20.1	17 42.3
Mon.	20	354 26 35.4	0 29 42.1	4 45 48.7	4 58 10.6	21.1	18 24.7
Tues.	21	6 30 16.6	12 28 53.1	5 7 10.6	5 12 47.5	22.1	19 6.0
Wed.	22	18 26 5.6	24 22 27.4	5 15 1.0	5 13 51.9	23.1	19 47.2
Thur.	23	30 18 30.2	36 14 44.4	5 9 21.5	5 1 32.2	24.1	20 29.2
Frid.	24	42 11 38.3	48 9 38.3	4 50 27.5	4 36 11.9	25.1	21 12.8
Sat.	25	54 9 8.4	60 10 30.5	4 18 51.3	3 58 33.3	26.1	21 58.5
Sun.	26	66 14 3.6	72 20 4.6	3 35 26.9	3 9 43.5	27.1	22 46.9
Mon.	27	78 28 47.6	84 40 24.8	2 41 36.4	2 11 21.1	28.1	23 37.7
Tues.	28	90 55 5.7	97 12 57.8	1 39 15.7	S. 1 5 40.6	29.1	6
Wed.	29	103 34 6.8	109 58 36.5	S. 0 30 58.3	N. 0 4 26.6	0.5	0 30.4
Thur.	30	116 26 29.4	122 57 46.8	N. 0 40 7.4	1 15 36.1	1.5	1 24.0
Frid.	31	129 32 28.8	136 10 34.8	N. 1 50 23.5	N. 2 23 59.8	2.5	2 17.6



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
WEDNESDAY 1.				FRIDAY 3.			
0	6 <sup>h</sup> 18 <sup>m</sup> 51 <sup>s</sup> .96	N.22 1 15.0	16.98	0	8 <sup>h</sup> 8 <sup>m</sup> 12 <sup>s</sup> .92	N.21 7 22.8	39.82
1	6 21 6.70	22 2 53.5	15.85	1	8 10 30.32	21 3 20.3	41.00
2	6 23 21.57	22 4 25.2	14.71	2	8 12 47.69	20 59 10.8	42.18
3	6 25 36.57	22 5 50.0	13.56	3	8 15 5.03	20 54 54.2	43.36
4	6 27 51.70	22 7 7.9	12.42	4	8 17 22.35	20 50 30.5	44.53
5	6 30 6.95	22 8 19.0	11.27	5	8 19 39.63	20 45 59.8	45.70
6	6 32 22.33	22 9 23.1	10.11	6	8 21 56.88	20 41 22.1	46.87
7	6 34 37.82	22 10 20.3	8.96	7	8 24 14.09	20 36 37.4	48.03
8	6 36 53.43	22 11 10.6	7.79	8	8 26 31.26	20 31 45.8	49.18
9	6 39 9.15	22 11 53.8	6.63	9	8 28 48.38	20 26 47.2	50.35
10	6 41 24.98	22 12 30.1	5.47	10	8 31 5.46	20 21 41.6	51.50
11	6 43 40.91	22 12 59.4	4.30	11	8 33 22.50	20 16 29.2	52.65
12	6 45 56.94	22 13 21.7	3.13	12	8 35 39.48	20 11 9.8	53.80
13	6 48 13.07	22 13 36.9	1.95	13	8 37 56.41	20 5 43.6	54.93
14	6 50 29.30	22 13 45.1	0.77	14	8 40 13.29	20 0 10.6	56.08
15	6 52 45.62	22 13 46.2	0.41	15	8 42 30.11	19 54 30.7	57.22
16	6 55 2.03	22 13 40.2	1.59	16	8 44 46.87	19 48 44.0	58.34
17	6 57 18.53	22 13 27.1	2.78	17	8 47 3.57	19 42 50.6	59.46
18	6 59 35.10	22 13 6.8	3.97	18	8 49 20.21	19 36 50.5	60.58
19	7 1 51.75	22 12 39.5	5.15	19	8 51 36.79	19 30 43.6	61.71
20	7 4 8.48	22 12 5.0	6.35	20	8 53 53.29	19 24 30.0	62.82
21	7 6 25.28	22 11 23.3	7.54	21	8 56 9.73	19 18 9.8	63.93
22	7 8 42.14	22 10 34.5	8.73	22	8 58 26.11	19 11 42.9	65.03
23	7 10 59.06	N.22 9 38.6	9.92	23	9 0 42.41	N.19 5 9.5	66.12
THURSDAY 2.				SATURDAY 4.			
0	7 13 16.05	N.22 8 35.4	11.12	0	9 2 58.64	N.18 58 29.4	67.22
1	7 15 33.10	22 7 25.1	12.32	1	9 5 14.80	18 51 42.8	68.30
2	7 17 50.19	22 6 7.6	13.52	2	9 7 30.88	18 44 49.8	69.38
3	7 20 7.34	22 4 42.9	14.72	3	9 9 46.89	18 37 50.2	70.46
4	7 22 24.54	22 3 11.0	15.92	4	9 12 2.82	18 30 44.2	71.53
5	7 24 41.77	22 1 31.9	17.12	5	9 14 18.67	18 23 31.8	72.60
6	7 26 59.05	21 59 45.6	18.32	6	9 16 34.44	18 16 13.0	73.66
7	7 29 16.36	21 57 52.1	19.52	7	9 18 50.13	18 8 47.9	74.71
8	7 31 33.71	21 55 51.4	20.72	8	9 21 5.74	18 1 16.5	75.76
9	7 33 51.08	21 53 43.4	21.92	9	9 23 21.26	17 53 38.8	76.80
10	7 36 8.48	21 51 28.3	23.12	10	9 25 36.70	17 45 54.9	77.83
11	7 38 25.90	21 49 6.0	24.32	11	9 27 52.06	17 38 4.8	78.86
12	7 40 43.34	21 46 36.5	25.52	12	9 30 7.33	17 30 8.6	79.88
13	7 43 0.80	21 43 59.8	26.72	13	9 32 22.52	17 22 6.2	80.90
14	7 45 18.26	21 41 15.9	27.92	14	9 34 37.62	17 13 57.8	81.90
15	7 47 35.74	21 38 24.8	29.12	15	9 36 52.64	17 5 43.4	82.91
16	7 49 53.22	21 35 26.5	30.32	16	9 39 7.57	16 57 22.9	83.91
17	7 52 10.71	21 32 21.0	31.51	17	9 41 22.42	16 48 56.5	84.89
18	7 54 28.19	21 29 8.4	32.70	18	9 43 37.18	16 40 24.2	85.88
19	7 56 45.67	21 25 48.6	33.89	19	9 45 51.85	16 31 45.9	86.86
20	7 59 3.15	21 22 21.7	35.08	20	9 48 6.43	16 23 1.9	87.82
21	8 1 20.61	21 18 47.6	36.27	21	9 50 20.92	16 14 12.1	88.78
22	8 3 38.06	21 15 6.5	37.45	22	9 52 35.33	16 5 16.5	89.74
23	8 5 55.50	21 11 18.2	38.64	23	9 54 49.65	15 56 15.2	90.68
24	8 8 12.92	N.21 7 22.8	39.82	24	9 57 3.89	N.15 47 8.3	91.62



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>SUNDAY 5.</b>				<b>TUESDAY 7.</b>			
0	9 57 3.89	N. 15 47 8.3	91.62	0	11 43 6.67	N. 6 55 5.1	126.50
1	9 59 18.04	15 37 55.8	92.55	1	11 45 18.30	6 42 24.6	126.98
2	10 1 32.10	15 28 37.7	93.48	2	11 47 29.93	6 29 41.3	127.45
3	10 3 46.08	15 19 14.1	94.40	3	11 49 41.56	6 16 55.2	127.92
4	10 5 59.97	15 9 44.9	95.31	4	11 51 53.21	6 4 6.3	128.38
5	10 8 13.78	15 0 10.4	96.20	5	11 54 4.86	5 51 14.7	128.82
6	10 10 27.51	14 50 30.5	97.10	6	11 56 16.53	5 38 20.5	129.24
7	10 12 41.15	14 40 45.2	97.98	7	11 58 28.23	5 25 23.8	129.65
8	10 14 54.71	14 30 54.7	98.86	8	12 0 39.94	5 12 24.7	130.06
9	10 17 8.19	14 20 58.9	99.72	9	12 2 51.67	4 59 23.1	130.46
10	10 19 21.59	14 10 58.0	100.58	10	12 5 3.44	4 46 19.2	130.84
11	10 21 34.91	14 0 51.9	101.44	11	12 7 15.24	4 33 13.0	131.21
12	10 23 48.16	13 50 40.7	102.28	12	12 9 27.07	4 20 4.7	131.56
13	10 26 1.33	13 40 24.5	103.12	13	12 11 38.94	4 6 54.3	131.91
14	10 28 14.42	13 30 3.2	103.95	14	12 13 50.85	3 53 41.8	132.25
15	10 30 27.43	13 19 37.0	104.77	15	12 16 2.80	3 40 27.3	132.57
16	10 32 40.37	13 9 6.0	105.58	16	12 18 14.81	3 27 10.9	132.88
17	10 34 53.24	12 58 30.1	106.38	17	12 20 26.86	3 13 52.7	133.18
18	10 37 6.04	12 47 49.4	107.17	18	12 22 38.97	3 0 32.8	133.46
19	10 39 18.77	12 37 4.0	107.96	19	12 24 51.13	2 47 11.2	133.73
20	10 41 31.43	12 26 13.9	108.73	20	12 27 3.36	2 33 48.0	134.00
21	10 43 44.03	12 15 19.2	109.49	21	12 29 15.65	2 20 23.2	134.25
22	10 45 56.56	12 4 20.0	110.25	22	12 31 28.01	2 6 57.0	134.49
23	10 48 9.03	N. 11 53 16.2	111.00	23	12 33 40.44	N. 1 53 29.4	134.72
<b>MONDAY 6.</b>				<b>WEDNESDAY 8.</b>			
0	10 50 21.44	N. 11 42 8.0	111.73	0	12 35 52.95	N. 1 40 0.4	134.93
1	10 52 33.79	11 30 55.4	112.46	1	12 38 5.54	1 26 30.3	135.12
2	10 54 46.08	11 19 38.4	113.18	2	12 40 18.20	1 12 59.0	135.31
3	10 56 58.32	11 8 17.2	113.89	3	12 42 30.95	0 59 26.6	135.48
4	10 59 10.51	10 56 51.7	114.59	4	12 44 43.79	0 45 53.3	135.63
5	11 1 22.64	10 45 22.1	115.28	5	12 46 56.72	0 32 19.0	135.78
6	11 3 34.72	10 33 48.4	115.96	6	12 49 9.75	0 18 43.9	135.91
7	11 5 46.76	10 22 10.6	116.63	7	12 51 22.88	N. 0 5 8.1	136.03
8	11 7 58.76	10 10 28.8	117.30	8	12 53 36.11	S. 0 8 28.4	136.13
9	11 10 10.71	9 58 43.0	117.96	9	12 55 49.44	0 22 5.5	136.23
10	11 12 22.63	9 46 53.3	118.59	10	12 58 2.88	0 35 43.2	136.31
11	11 14 34.51	9 34 59.9	119.22	11	13 0 16.43	0 49 21.2	136.37
12	11 16 46.35	9 23 2.7	119.84	12	13 2 30.10	1 2 59.6	136.42
13	11 18 58.16	9 11 1.8	120.46	13	13 4 43.89	1 16 38.2	136.46
14	11 21 9.94	8 58 57.2	121.06	14	13 6 57.80	1 30 17.1	136.48
15	11 23 21.69	8 46 49.1	121.65	15	13 9 11.84	1 43 56.0	136.48
16	11 25 33.42	8 34 37.4	122.23	16	13 11 26.02	1 57 34.9	136.48
17	11 27 45.12	8 22 22.3	122.80	17	13 13 40.32	2 11 13.8	136.47
18	11 29 56.81	8 10 3.8	123.36	18	13 15 54.76	2 24 52.5	136.43
19	11 32 8.48	7 57 42.0	123.91	19	13 18 9.34	2 38 30.9	136.38
20	11 34 20.13	7 45 16.9	124.45	20	13 20 24.06	2 52 9.0	136.32
21	11 36 31.78	7 32 48.6	124.98	21	13 22 38.93	3 5 46.7	136.24
22	11 38 43.41	7 20 17.1	125.50	22	13 24 53.95	3 19 23.9	136.15
23	11 40 55.04	7 7 42.6	126.00	23	13 27 9.12	3 32 0.5	136.04
24	11 43 6.67	N. 6 55 5.1	126.50	24	13 29 24.45	S. 3 46 36.4	135.92



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 9.</b>				<b>SATURDAY 11.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	13 29 24.45	S. 3 46 36.4	135.92	0	15 21 36.39	S. 13 55 32.8	111.64
1	13 31 39.94	4 0 11.5	135.78	1	15 24 2.32	14 6 40.0	110.74
2	13 33 55.59	4 13 45.8	135.64	2	15 26 28.49	14 17 41.7	109.82
3	13 36 11.41	4 27 19.2	135.47	3	15 28 54.91	14 28 37.8	108.88
4	13 38 27.39	4 40 51.5	135.28	4	15 31 21.57	14 39 28.3	107.94
5	13 40 43.55	4 54 22.6	135.09	5	15 33 48.48	14 50 13.1	106.98
6	13 42 59.88	5 7 52.6	134.88	6	15 36 15.62	15 0 52.1	106.00
7	13 45 16.39	5 21 21.2	134.66	7	15 38 43.01	15 11 25.1	105.01
8	13 47 33.09	5 34 48.5	134.42	8	15 41 10.64	15 21 52.2	104.00
9	13 49 49.96	5 48 14.2	134.16	9	15 43 38.50	15 32 13.1	102.97
10	13 52 7.02	6 1 38.4	133.88	10	15 46 6.60	15 42 27.8	101.93
11	13 54 24.28	6 15 0.8	133.59	11	15 48 34.94	15 52 36.3	100.88
12	13 56 41.72	6 28 21.5	133.29	12	15 51 3.51	16 2 38.4	99.81
13	13 58 59.36	6 41 40.3	132.97	13	15 53 32.31	16 12 34.0	98.73
14	14 1 17.19	6 54 57.2	132.64	14	15 56 1.35	16 22 23.1	97.63
15	14 3 35.23	7 8 12.0	132.28	15	15 58 30.61	16 32 5.6	96.52
16	14 5 53.47	7 21 24.6	131.92	16	16 1 0.09	16 41 41.3	95.38
17	14 8 11.92	7 34 35.0	131.53	17	16 3 29.80	16 51 10.2	94.24
18	14 10 30.57	7 47 43.0	131.13	18	16 5 59.73	17 0 32.2	93.09
19	14 12 49.44	8 0 48.6	130.72	19	16 8 29.88	17 9 47.3	91.92
20	14 15 8.52	8 13 51.7	130.29	20	16 11 0.24	17 18 55.3	90.74
21	14 17 27.81	8 26 52.1	129.84	21	16 13 30.81	17 27 56.2	89.54
22	14 19 47.32	8 39 49.8	129.38	22	16 16 1.59	17 36 49.8	88.33
23	14 22 7.06	S. 8 52 44.7	128.90	23	16 18 32.57	S. 17 45 36.2	87.11
<b>FRIDAY 10.</b>				<b>SUNDAY 12.</b>			
0	14 24 27.01	S. 9 5 36.6	128.40	0	16 21 3.76	S. 17 54 15.2	85.88
1	14 26 47.19	9 18 25.5	127.90	1	16 23 35.15	18 2 46.8	84.63
2	14 29 7.59	9 31 11.4	127.38	2	16 26 6.73	18 11 10.8	83.37
3	14 31 28.22	9 43 54.0	126.83	3	16 28 38.50	18 19 27.2	82.10
4	14 33 49.08	9 56 33.3	126.26	4	16 31 10.46	18 27 36.0	80.82
5	14 36 10.17	10 9 9.1	125.68	5	16 33 42.61	18 35 37.0	79.52
6	14 38 31.49	10 21 41.5	125.10	6	16 36 14.93	18 43 30.3	78.21
7	14 40 53.05	10 34 10.3	124.49	7	16 38 47.43	18 51 15.6	76.89
8	14 43 14.84	10 46 35.4	123.86	8	16 41 20.10	18 58 53.0	75.57
9	14 45 36.87	10 58 56.6	123.22	9	16 43 52.93	19 6 22.4	74.23
10	14 47 59.14	11 11 14.0	122.56	10	16 46 25.93	19 13 43.7	72.88
11	14 50 21.64	11 23 27.3	121.89	11	16 48 59.08	19 20 56.9	71.52
12	14 52 44.39	11 35 36.6	121.20	12	16 51 32.38	19 28 1.9	70.14
13	14 55 7.38	11 47 41.7	120.48	13	16 54 5.83	19 34 58.6	68.76
14	14 57 30.61	11 59 42.4	119.76	14	16 56 39.42	19 41 47.1	67.37
15	14 59 54.09	12 11 38.8	119.03	15	16 59 13.15	19 48 27.1	65.97
16	15 2 17.81	12 23 30.7	118.28	16	17 1 47.01	19 54 58.7	64.56
17	15 4 41.77	12 35 18.1	117.50	17	17 4 20.99	20 1 21.9	63.15
18	15 7 5.98	12 47 0.7	116.70	18	17 6 55.09	20 7 36.6	61.73
19	15 9 30.43	12 58 38.5	115.90	19	17 9 29.30	20 13 42.6	60.29
20	15 11 55.13	13 10 11.5	115.08	20	17 12 3.62	20 19 40.0	58.85
21	15 14 20.08	13 21 39.5	114.25	21	17 14 38.05	20 25 28.8	57.40
22	15 16 45.27	13 33 2.5	113.40	22	17 17 12.57	20 31 8.8	55.94
23	15 19 10.71	13 44 20.3	112.53	23	17 19 47.19	20 36 40.1	54.48
24	15 21 36.39	S. 13 55 32.8	111.64	24	17 22 21.89	S. 20 42 2.6	53.02



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 13.</b>				<b>WEDNESDAY 15.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
0	17 22 21.89	S. 20 42 2.6	53.02	0	19 25 29.77	S. 22 2 29.6	18.93
1	17 24 56.66	20 47 16.3	51.54	1	19 28 0.07	22 0 31.8	20.32
2	17 27 31.50	20 52 21.0	50.05	2	19 30 30.11	21 58 25.7	21.72
3	17 30 6.41	20 57 16.9	48.57	3	19 32 59.90	21 56 11.2	23.11
4	17 32 41.37	21 2 3.8	47.08	4	19 35 29.42	21 53 48.4	24.48
5	17 35 16.38	21 6 41.8	45.58	5	19 37 58.67	21 51 17.4	25.85
6	17 37 51.43	21 11 10.8	44.07	6	19 40 27.64	21 48 38.2	27.21
7	17 40 26.52	21 15 30.7	42.57	7	19 42 56.33	21 45 50.9	28.55
8	17 43 1.64	21 19 41.6	41.06	8	19 45 24.74	21 42 55.6	29.89
9	17 45 36.78	21 23 43.4	39.54	9	19 47 52.86	21 39 52.2	31.22
10	17 48 11.94	21 27 36.1	38.02	10	19 50 20.68	21 36 40.9	32.54
11	17 50 47.11	21 31 19.7	36.50	11	19 52 48.20	21 33 21.7	33.85
12	17 53 22.28	21 34 54.1	34.98	12	19 55 15.43	21 29 54.7	35.15
13	17 55 57.45	21 38 19.4	33.45	13	19 57 42.35	21 26 19.9	36.44
14	17 58 32.61	21 41 35.5	31.93	14	20 0 8.95	21 22 37.4	37.72
15	18 1 7.74	21 44 42.5	30.40	15	20 2 35.24	21 18 47.3	38.98
16	18 3 42.85	21 47 40.3	28.87	16	20 5 1.21	21 14 49.6	40.24
17	18 6 17.93	21 50 28.9	27.33	17	20 7 26.86	21 10 44.4	41.49
18	18 8 52.97	21 53 8.3	25.80	18	20 9 52.19	21 6 31.7	42.73
19	18 11 27.96	21 55 38.5	24.27	19	20 12 17.18	21 2 11.6	43.96
20	18 14 2.89	21 57 59.5	22.74	20	20 14 41.84	20 57 44.2	45.17
21	18 16 37.77	22 0 11.4	21.21	21	20 17 6.17	20 53 9.6	46.37
22	18 19 12.57	22 2 14.0	19.67	22	20 19 30.16	20 48 27.8	47.56
23	18 21 47.29	S. 22 4 7.4	18.14	23	20 21 53.81	S. 20 43 38.9	48.73
<b>TUESDAY 14.</b>				<b>THURSDAY 16.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
0	18 24 21.93	S. 22 5 51.7	16.62	0	20 24 17.12	S. 20 38 43.0	49.90
1	18 26 56.48	22 7 26.8	15.08	1	20 26 40.08	20 33 40.1	51.05
2	18 29 30.93	22 8 52.7	13.56	2	20 29 2.69	20 28 30.3	52.20
3	18 32 5.27	22 10 9.5	12.04	3	20 31 24.95	20 23 13.7	53.33
4	18 34 39.50	22 11 17.2	10.52	4	20 33 46.86	20 17 50.4	54.45
5	18 37 13.61	22 12 15.7	9.00	5	20 36 8.41	20 12 20.3	55.57
6	18 39 47.60	22 13 5.2	7.48	6	20 38 29.61	20 6 43.6	56.66
7	18 42 21.45	22 13 45.5	5.97	7	20 40 50.45	20 1 0.4	57.74
8	18 44 55.15	22 14 16.8	4.47	8	20 43 10.93	19 55 10.7	58.82
9	18 47 28.71	22 14 39.1	2.96	9	20 45 31.04	19 49 14.6	59.88
10	18 50 2.12	22 14 52.3	1.46	10	20 47 50.80	19 43 12.2	60.93
11	18 52 35.36	22 14 56.6	0.03	11	20 50 10.19	19 37 3.5	61.96
12	18 55 8.43	22 14 51.9	1.52	12	20 52 29.21	19 30 48.7	62.98
13	18 57 41.33	22 14 38.3	3.01	13	20 54 47.87	19 24 27.8	63.99
14	19 0 14.04	22 14 15.8	4.49	14	20 57 6.16	19 18 0.8	65.00
15	19 2 46.56	22 13 44.4	5.97	15	20 59 24.09	19 11 27.8	65.98
16	19 5 18.89	22 13 4.2	7.43	16	21 1 41.65	19 4 49.0	66.96
17	19 7 51.02	22 12 15.2	8.89	17	21 3 58.84	18 58 4.3	67.92
18	19 10 22.94	22 11 17.5	10.35	18	21 6 15.66	18 51 13.9	68.87
19	19 12 54.65	22 10 11.0	11.80	19	21 8 32.11	18 44 17.9	69.81
20	19 15 26.14	22 8 55.9	13.24	20	21 10 48.20	18 37 16.2	70.74
21	19 17 57.40	22 7 32.1	14.67	21	21 13 3.92	18 30 9.0	71.66
22	19 20 28.43	22 5 59.8	16.09	22	21 15 19.26	18 22 56.3	72.56
23	19 22 59.22	22 4 19.0	17.52	23	21 17 34.24	18 15 38.3	73.44
24	19 25 29.77	S. 22 2 29.6	18.93	24	21 19 48.85	S. 18 8 15.0	74.32



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>FRIDAY 17.</b>				<b>SUNDAY 19.</b>			
0	21 19 48.85	S. 18 8 15.0	74.32	0	23 0 45.73	S. 10 51 52.0	103.47
1	21 22 3.09	18 0 46.5	75.19	1	23 2 44.45	10 41 30.1	103.83
2	21 24 16.97	17 53 12.7	76.05	2	23 4 42.91	10 31 6.1	104.18
3	21 26 30.48	17 45 33.9	76.89	3	23 6 41.12	10 20 39.9	104.53
4	21 28 43.62	17 37 50.1	77.72	4	23 8 39.08	10 10 11.7	104.87
5	21 30 56.40	17 30 1.3	78.54	5	23 10 36.79	9 59 41.4	105.21
6	21 33 8.81	17 22 7.6	79.34	6	23 12 34.27	9 49 9.2	105.53
7	21 35 20.86	17 14 9.2	80.13	7	23 14 31.51	9 38 35.1	105.84
8	21 37 32.55	17 6 6.0	80.92	8	23 16 28.51	9 27 59.1	106.15
9	21 39 43.88	16 57 58.1	81.70	9	23 18 25.28	9 17 21.3	106.44
10	21 41 54.85	16 49 45.6	82.46	10	23 20 21.83	9 6 41.8	106.73
11	21 44 5.46	16 41 28.6	83.21	11	23 22 18.15	8 56 0.5	107.02
12	21 46 15.71	16 33 7.1	83.95	12	23 24 14.26	8 45 17.5	107.30
13	21 48 25.61	16 24 41.2	84.67	13	23 26 10.15	8 34 32.9	107.56
14	21 50 35.16	16 16 11.0	85.38	14	23 28 5.83	8 23 46.8	107.82
15	21 52 44.35	16 7 36.6	86.09	15	23 30 1.30	8 12 59.1	108.07
16	21 54 53.20	15 58 57.9	86.79	16	23 31 56.56	8 2 9.9	108.32
17	21 57 1.70	15 50 15.1	87.47	17	23 33 51.63	7 51 19.2	108.56
18	21 59 9.85	15 41 28.3	88.13	18	23 35 46.50	7 40 27.2	108.78
19	22 1 17.66	15 32 37.5	88.79	19	23 37 41.17	7 29 33.8	109.00
20	22 3 25.12	15 23 42.8	89.44	20	23 39 35.65	7 18 39.2	109.22
21	22 5 32.25	15 14 44.2	90.08	21	23 41 29.95	7 7 43.2	109.43
22	22 7 39.04	15 5 41.8	90.71	22	23 43 24.06	6 56 46.0	109.63
23	22 9 45.49	S. 14 56 35.7	91.32	23	23 45 18.00	S. 6 45 47.7	109.82
<b>SATURDAY 18.</b>				<b>MONDAY 20.</b>			
0	22 11 51.62	S. 14 47 26.0	91.92	0	23 47 11.75	S. 6 34 48.2	110.01
1	22 13 57.41	14 38 12.7	92.52	1	23 49 5.34	6 23 47.6	110.18
2	22 16 2.87	14 28 55.8	93.11	2	23 50 58.76	6 12 46.0	110.36
3	22 18 8.01	14 19 35.4	93.68	3	23 52 52.02	6 1 43.3	110.53
4	22 20 12.82	14 10 11.7	94.23	4	23 54 45.12	5 50 39.6	110.68
5	22 22 17.32	14 0 44.6	94.79	5	23 56 38.06	5 39 35.1	110.83
6	22 24 21.50	13 51 14.2	95.33	6	23 58 30.85	5 28 29.6	110.98
7	22 26 25.36	13 41 40.6	95.87	7	0 0 23.49	5 17 23.3	111.12
8	22 28 28.91	13 32 3.8	96.39	8	0 2 15.98	5 6 16.1	111.26
9	22 30 32.15	13 22 23.9	96.91	9	0 4 8.34	4 55 8.2	111.38
10	22 32 35.08	13 12 40.9	97.41	10	0 6 0.56	4 43 59.6	111.49
11	22 34 37.71	13 2 55.0	97.89	11	0 7 52.64	4 32 50.3	111.61
12	22 36 40.04	12 53 6.2	98.37	12	0 9 44.59	4 21 40.3	111.72
13	22 38 42.07	12 43 14.5	98.85	13	0 11 36.42	4 10 29.7	111.82
14	22 40 43.81	12 33 20.0	99.32	14	0 13 28.12	3 59 18.5	111.91
15	22 42 45.26	12 23 22.7	99.78	15	0 15 19.71	3 48 6.8	111.99
16	22 44 46.42	12 13 22.7	100.22	16	0 17 11.19	3 36 54.6	112.07
17	22 46 47.30	12 3 20.0	100.66	17	0 19 2.55	3 25 42.0	112.14
18	22 48 47.89	11 53 14.8	101.08	18	0 20 53.80	3 14 28.9	112.22
19	22 50 48.21	11 43 7.1	101.50	19	0 22 44.95	3 3 15.4	112.28
20	22 52 48.25	11 32 56.8	101.92	20	0 24 36.00	2 52 1.6	112.33
21	22 54 48.02	11 22 44.1	102.32	21	0 26 26.96	2 40 47.5	112.38
22	22 56 47.52	11 12 29.0	102.70	22	0 28 17.83	2 29 33.1	112.42
23	22 58 46.76	11 2 11.7	103.09	23	0 30 8.60	2 18 18.4	112.46
24	23 0 45.73	S. 10 51 52.0	103.47	24	0 31 59.29	S. 2 7 3.6	112.48



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 21.</b>				<b>THURSDAY 23.</b>			
0	h m s	° ' "		0	h m s	° ' "	
0	31 59.29	S. 2 7 3.6	112.48	2	0 5.16	N. 6 45 15.6	107.08
1	0 33 49.90	1 55 48.6	112.51	1	2 1 56.17	6 55 57.3	106.83
2	0 35 40.44	1 44 33.5	112.53	2	3 47.27	7 6 37.5	106.57
3	0 37 30.90	1 33 18.3	112.54	3	2 5 38.47	7 17 16.1	106.30
4	0 39 21.29	1 22 3.0	112.55	4	2 7 29.76	7 27 53.1	106.02
5	0 41 11.61	1 10 47.7	112.55	5	2 9 21.16	7 38 28.4	105.74
6	0 43 1.88	0 59 32.4	112.55	6	2 11 12.67	7 49 2.0	105.45
7	0 44 52.08	0 48 17.1	112.53	7	2 13 4.28	7 59 33.8	105.16
8	0 46 42.23	0 37 2.0	112.51	8	2 14 56.00	8 10 3.9	104.87
9	0 48 32.33	0 25 47.0	112.49	9	2 16 47.84	8 20 32.2	104.56
10	0 50 22.38	0 14 32.1	112.47	10	2 18 39.80	8 30 58.6	104.24
11	0 52 12.38	S. 0 3 17.4	112.43	11	2 20 31.88	8 41 23.1	103.92
12	0 54 2.35	N. 0 7 57.1	112.39	12	2 22 24.09	8 51 45.7	103.60
13	0 55 52.28	0 19 11.3	112.34	13	2 24 16.42	9 2 6.3	103.27
14	0 57 42.18	0 30 25.2	112.29	14	2 26 8.89	9 12 24.9	102.93
15	0 59 32.05	0 41 38.8	112.23	15	2 28 1.49	9 22 41.5	102.59
16	1 1 21.90	0 52 52.0	112.17	16	2 29 54.22	9 32 56.0	102.23
17	1 3 11.72	1 4 4.9	112.11	17	2 31 47.09	9 43 8.3	101.88
18	1 5 1.53	1 15 17.3	112.03	18	2 33 40.11	9 53 18.5	101.52
19	1 6 51.32	1 26 29.2	111.94	19	2 35 33.27	10 3 26.5	101.15
20	1 8 41.11	1 37 40.6	111.86	20	2 37 26.57	10 13 32.3	100.77
21	1 10 30.88	1 48 51.5	111.77	21	2 39 20.03	10 23 35.8	100.38
22	1 12 20.65	2 0 1.9	111.67	22	2 41 13.64	10 33 36.9	99.99
23	1 14 10.42	N. 2 11 11.6	111.56	23	2 43 7.41	N. 10 43 35.7	99.60
<b>WEDNESDAY 22.</b>				<b>FRIDAY 24.</b>			
0	1 16 0.20	N. 2 22 20.6	111.45	0	2 45 1.33	N. 10 53 32.1	99.20
1	1 17 49.98	2 33 29.0	111.34	1	2 46 55.42	11 3 26.1	98.78
2	1 19 39.78	2 44 36.7	111.22	2	2 48 49.67	11 13 17.5	98.36
3	1 21 29.59	2 55 43.6	111.08	3	2 50 44.09	11 23 6.4	97.94
4	1 23 19.41	3 6 49.7	110.96	4	2 52 38.68	11 32 52.8	97.52
5	1 25 9.26	3 17 55.1	110.83	5	2 54 33.44	11 42 36.6	97.08
6	1 26 59.14	3 28 59.6	110.68	6	2 56 28.38	11 52 17.7	96.63
7	1 28 49.04	3 40 3.2	110.53	7	2 58 23.49	12 1 56.2	96.18
8	1 30 38.98	3 51 5.9	110.37	8	3 0 18.78	12 11 31.9	95.72
9	1 32 28.95	4 2 7.6	110.20	9	3 2 14.26	12 21 4.8	95.25
10	1 34 18.96	4 13 8.3	110.03	10	3 4 9.92	12 30 34.9	94.78
11	1 36 9.02	4 24 8.0	109.87	11	3 6 5.77	12 40 2.2	94.30
12	1 37 59.12	4 35 6.7	109.69	12	3 8 1.81	12 49 26.5	93.81
13	1 39 49.27	4 46 4.3	109.50	13	3 9 58.04	12 58 47.9	93.32
14	1 41 39.47	4 57 0.7	109.31	14	3 11 54.46	13 8 6.3	92.82
15	1 43 29.73	5 7 56.0	109.12	15	3 13 51.09	13 17 21.7	92.31
16	1 45 20.05	5 18 50.1	108.92	16	3 15 47.91	13 26 34.0	91.78
17	1 47 10.43	5 29 43.0	108.71	17	3 17 44.93	13 35 43.1	91.26
18	1 49 0.88	5 40 34.6	108.49	18	3 19 42.15	13 44 49.1	90.73
19	1 50 51.40	5 51 24.9	108.27	19	3 21 39.58	13 53 51.9	90.20
20	1 52 41.99	6 2 13.9	108.04	20	3 23 37.22	14 2 51.5	89.65
21	1 54 32.66	6 13 1.4	107.81	21	3 25 35.06	14 11 47.7	89.09
22	1 56 23.41	6 23 47.6	107.57	22	3 27 33.12	14 20 40.6	88.53
23	1 58 14.24	6 34 32.3	107.33	23	3 29 31.39	14 29 30.1	87.97
24	2 0 5.16	N. 6 45 15.6	107.08	24	3 31 29.88	N. 14 38 16.2	87.39



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 25.</b>				<b>MONDAY 27.</b>			
0	<sup>h</sup> 3 <sup>m</sup> 31 <sup>s</sup> 29.88	N. 14° 38' 16.2"	87.39	0	<sup>h</sup> 5 <sup>m</sup> 10 <sup>s</sup> 53.16	N. 20° 16' 17.8"	50.38
1	3 33 28.58	14 46 58.8	86.80	1	5 13 3.30	20 21 17.2	49.42
2	3 35 27.50	14 55 37.8	86.21	2	5 15 13.68	20 26 10.8	48.44
3	3 37 26.64	15 4 13.3	85.61	3	5 17 24.29	20 30 58.5	47.46
4	3 39 26.01	15 12 45.1	85.00	4	5 19 35.13	20 35 40.3	46.47
5	3 41 25.59	15 21 13.3	84.39	5	5 21 46.20	20 40 16.2	45.48
6	3 43 25.40	15 29 37.8	83.77	6	5 23 57.50	20 44 46.1	44.48
7	3 45 25.44	15 37 58.5	83.13	7	5 26 9.02	20 49 10.0	43.47
8	3 47 25.71	15 46 15.4	82.50	8	5 28 20.76	20 53 27.7	42.44
9	3 49 26.21	15 54 28.5	81.85	9	5 30 32.72	20 57 39.3	41.42
10	3 51 26.94	16 2 37.6	81.19	10	5 32 44.91	21 1 44.8	40.40
11	3 53 27.90	16 10 42.8	80.53	11	5 34 57.31	21 5 44.1	39.36
12	3 55 29.09	16 18 44.0	79.87	12	5 37 9.93	21 9 37.1	38.31
13	3 57 30.52	16 26 41.2	79.18	13	5 39 22.76	21 13 23.8	37.26
14	3 59 32.18	16 34 34.2	78.49	14	5 41 35.80	21 17 4.2	36.20
15	4 1 34.08	16 42 23.1	77.81	15	5 43 49.05	21 20 38.2	35.13
16	4 3 36.22	16 50 7.9	77.11	16	5 46 2.51	21 24 5.8	34.07
17	4 5 38.60	16 57 48.4	76.39	17	5 48 16.17	21 27 27.0	32.99
18	4 7 41.21	17 5 24.6	75.67	18	5 50 30.03	21 30 41.7	31.90
19	4 9 44.07	17 12 56.5	74.95	19	5 52 44.09	21 33 49.8	30.81
20	4 11 47.17	17 20 24.0	74.21	20	5 54 58.34	21 36 51.4	29.71
21	4 13 50.51	17 27 47.0	73.47	21	5 57 12.79	21 39 46.3	28.60
22	4 15 54.10	17 35 5.6	72.72	22	5 59 27.43	21 42 34.6	27.50
23	4 17 57.93	N. 17° 42' 19.7"	71.96	23	6 1 42.25	N. 21° 45' 16.3"	26.38
<b>SUNDAY 26.</b>				<b>TUESDAY 28.</b>			
0	4 20 2.00	N. 17° 49' 20.1"	71.19	0	6 3 57.25	N. 21° 47' 51.2"	25.26
1	4 22 6.32	17 56 34.0	70.42	1	6 6 12.44	21 50 19.4	24.13
2	4 24 10.88	18 3 34.2	69.63	2	6 8 27.80	21 52 40.8	23.00
3	4 26 15.69	18 10 29.6	68.84	3	6 10 43.34	21 54 55.4	21.87
4	4 28 20.75	18 17 20.3	68.05	4	6 12 59.06	21 57 3.2	20.73
5	4 30 26.05	18 24 6.2	67.24	5	6 15 14.94	21 59 4.1	19.57
6	4 32 31.60	18 30 47.2	66.42	6	6 17 30.98	22 0 58.0	18.42
7	4 34 37.39	18 37 23.3	65.60	7	6 19 47.19	22 2 45.1	17.27
8	4 36 43.43	18 43 54.4	64.77	8	6 22 3.55	22 4 25.1	16.10
9	4 38 49.71	18 50 20.5	63.93	9	6 24 20.07	22 5 58.2	14.93
10	4 40 56.24	18 56 41.6	63.08	10	6 26 36.74	22 7 24.2	13.75
11	4 43 3.02	19 2 57.5	62.22	11	6 28 53.56	22 8 43.2	12.57
12	4 45 10.03	19 9 8.2	61.36	12	6 31 10.53	22 9 55.1	11.39
13	4 47 17.29	19 15 13.8	60.49	13	6 33 27.63	22 10 59.9	10.21
14	4 49 24.80	19 21 14.1	59.61	14	6 35 44.87	22 11 57.6	9.02
15	4 51 32.55	19 27 9.1	58.72	15	6 38 2.25	22 12 48.1	7.83
16	4 53 40.55	19 32 58.7	57.82	16	6 40 19.75	22 13 31.5	6.63
17	4 55 48.79	19 38 43.0	56.92	17	6 42 37.38	22 14 7.7	5.43
18	4 57 57.27	19 44 21.8	56.01	18	6 44 55.13	22 14 36.7	4.23
19	5 0 5.98	19 49 55.1	55.09	19	6 47 12.99	22 14 58.4	3.02
20	5 2 14.94	19 55 22.9	54.17	20	6 49 30.97	22 15 12.9	1.81
21	5 4 24.14	20 0 45.2	53.24	21	6 51 49.06	22 15 20.1	0.60
22	5 6 33.58	20 6 1.8	52.29	22	6 54 7.25	22 15 20.1	0.62
23	5 8 43.25	20 11 12.7	51.33	23	6 56 25.54	22 15 12.7	1.83
24	5 10 53.16	N. 20° 16' 17.8"	50.38	24	6 58 43.93	N. 22° 14' 58.1"	3.05



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 29.</b>				<b>THURSDAY 30.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	6 58 43.93	N. 22 14 58.1	3.05	0	7 54 23.63	N. 21 32 7.0	32.68
1	7 1 2.41	22 14 36.1	4.28	1	7 56 43.10	21 28 47.2	33.92
2	7 3 20.98	22 14 6.7	5.51	2	7 59 2.57	21 25 20.0	35.14
3	7 5 39.64	22 13 30.0	6.73	3	8 1 22.02	21 21 45.5	36.36
4	7 7 58.38	22 12 45.9	7.96	4	8 3 41.45	21 18 3.7	37.58
5	7 10 17.20	22 11 54.5	9.19	5	8 6 0.86	21 14 14.5	38.81
6	7 12 36.08	22 10 55.6	10.43	6	8 8 20.25	21 10 18.0	40.03
7	7 14 55.04	22 9 49.3	11.67	7	8 10 39.61	21 6 14.2	41.23
8	7 17 14.06	22 8 35.6	12.89	8	8 12 58.93	21 2 3.2	42.45
9	7 19 33.13	22 7 14.6	14.12	9	8 15 18.22	20 57 44.8	43.67
10	7 21 52.26	22 5 46.1	15.37	10	8 17 37.47	20 53 19.2	44.87
11	7 24 11.45	22 4 10.1	16.61	11	8 19 56.68	20 48 46.4	46.07
12	7 26 30.68	22 2 26.8	17.84	12	8 22 15.84	20 44 6.4	47.27
13	7 28 49.95	22 0 36.0	19.09	13	8 24 34.95	20 39 19.2	48.47
14	7 31 9.26	21 58 37.7	20.33	14	8 26 54.01	20 34 24.8	49.66
15	7 33 28.61	21 56 32.1	21.56	15	8 29 13.02	20 29 23.3	50.84
16	7 35 47.99	21 54 19.0	22.81	16	8 31 31.96	20 24 14.7	52.03
17	7 38 7.39	21 51 58.4	24.04	17	8 33 50.84	20 18 59.0	53.21
18	7 40 26.82	21 49 30.5	25.27	18	8 36 9.66	20 13 36.2	54.38
19	7 42 46.27	21 46 55.1	26.52	19	8 38 28.41	20 8 6.5	55.54
20	7 45 5.73	21 44 12.3	27.75	20	8 40 47.09	20 2 29.7	56.72
21	7 47 25.20	21 41 22.1	28.99	21	8 43 5.69	19 56 45.9	57.88
22	7 49 44.67	21 38 24.4	30.23	22	8 45 24.22	19 50 55.2	59.03
23	7 52 4.15	21 35 19.4	31.45	23	8 47 42.67	19 44 57.6	60.18
24	7 54 23.63	N. 21 32 7.0	32.68	24	8 50 1.03	N. 19 38 53.1	61.32

## PHASES OF THE MOON.

June 6	☾	First Quarter	- - - - -	<sup>h</sup> <sup>m</sup>
13	○	Full Moon	- - - - -	1 47.2
20	☾	Last Quarter	- - - - -	9 33.8
28	●	New Moon	- - - - -	11 33.2

June 11	☾	Perigee	- - - - -	<sup>h</sup>
23	☾	Apogee	- - - - -	1



# MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	SUN W.	23 40 30	3218	25 6 18	3204	26 32 22	3192	27 58 41	3179
	Spica E.	107 35 29	2866	106 2 26	2857	104 29 12	2848	102 55 47	2839
2	SUN W.	35 13 53	3121	36 41 37	3110	38 9 34	3099	39 37 45	3088
	Spica E.	95 5 48	2795	93 31 13	2786	91 56 27	2777	90 21 29	2767
3	SUN W.	47 2 2	3033	48 31 34	3022	50 1 20	3010	51 31 21	2999
	Spica E.	82 23 36	2721	80 47 24	2712	79 11 0	2703	77 34 24	2693
4	SUN W.	59 4 54	2942	60 36 20	2930	62 8 1	2918	63 39 57	2905
	Pollux W.	21 40 56	2804	23 15 19	2768	24 50 29	2737	26 26 19	2710
	Spica E.	69 28 11	2646	67 50 18	2635	66 12 11	2626	64 33 52	2617
	Antares E.	115 21 48	2657	113 44 10	2644	112 6 15	2633	110 28 5	2622
5	SUN W.	71 23 29	2845	72 56 58	2832	74 30 44	2821	76 4 45	2808
	Pollux W.	34 33 43	2602	36 12 35	2585	37 51 51	2567	39 31 31	2551
	Spica E.	56 19 0	2569	54 39 23	2560	52 59 33	2551	51 19 31	2543
	Antares E.	102 13 14	2562	100 33 27	2550	98 53 23	2539	97 13 4	2526
	Saturn E.	119 59 51	2496	118 18 32	2484	116 36 56	2473	114 55 5	2461
6	SUN W.	83 59 1	2744	85 34 42	2732	87 10 40	2719	88 46 55	2706
	Pollux W.	47 55 21	2475	49 37 9	2460	51 19 18	2447	53 1 46	2433
	Regulus W.	11 59 13	2531	13 39 43	2497	15 21 1	2468	17 2 59	2444
	Spica E.	42 56 26	2504	41 15 18	2497	39 34 1	2492	37 52 37	2487
	Antares E.	88 47 18	2468	87 5 20	2456	85 23 5	2445	83 40 34	2433
7	SUN W.	96 52 27	2643	98 30 24	2630	100 8 38	2618	101 47 9	2605
	Pollux W.	61 38 57	2366	63 23 20	2354	65 8 1	2342	66 53 0	2330
	Regulus W.	25 40 8	2357	27 24 45	2343	29 9 42	2328	30 55 0	2315
	Spica E.	29 24 36	2488	27 43 6	2495	26 1 46	2508	24 20 44	2526
	Antares E.	75 3 55	2377	73 19 47	2366	71 35 24	2356	69 50 46	2346
8	SUN W.	110 3 52	2546	111 44 1	2535	113 24 25	2525	115 5 4	2514
	Pollux W.	75 42 17	2271	77 28 59	2261	79 15 56	2249	81 3 10	2239
	Regulus W.	39 46 13	2254	41 33 21	2243	43 20 45	2231	45 8 26	2220
9	Antares E.	61 3 58	2298	59 17 56	2290	57 31 42	2282	55 45 16	2275
	Saturn E.	78 11 54	2220	76 23 57	2210	74 35 44	2200	72 47 16	2190
	α Aquilæ E.	106 41 4	2931	105 9 24	2909	103 37 17	2889	102 4 44	2870
	SUN W.	123 31 56	2465	125 13 58	2456	126 56 13	2448	128 38 39	2441
	Pollux W.	90 2 59	2193	91 51 37	2184	93 40 28	2177	95 29 30	2170
10	Regulus W.	54 10 39	2172	55 59 48	2164	57 49 9	2156	59 38 44	2149
	Antares E.	46 50 43	2248	45 3 27	2245	43 16 7	2243	41 28 44	2243
	Saturn E.	63 41 18	2144	61 51 26	2136	60 1 22	2128	58 11 5	2121
	α Aquilæ E.	94 16 30	2798	92 41 59	2788	91 7 15	2779	89 32 19	2772
	SUN W.	68 49 16	2117	70 39 50	2112	72 30 31	2107	74 21 20	2103
10	Antares E.	32 32 31	2269	30 45 45	2283	28 59 20	2300	27 13 20	2322
	Saturn E.	48 57 7	2090	47 5 52	2086	45 14 31	2081	43 23 3	2077
	α Aquilæ E.	81 36 1	2760	80 0 40	2762	78 25 23	2767	76 50 12	2774
	Fomalhaut E.	115 18 4	2363	113 33 36	2351	111 48 51	2341	110 3 51	2332



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>b</sup> .	P.L. of diff.	XVIII <sup>b</sup> .	P.L. of diff.	XXI <sup>b</sup> .	P.L. of diff.
		° ' "		° ' "		° ' "		° ' "	
1	Sun W.	29 25 15	3167	30 52 4	3156	32 19 6	3144	33 46 23	3133
	Spica E.	101 22 10	2831	99 48 22	2821	98 14 22	2813	96 40 11	2804
2	Sun W.	41 6 9	3077	42 34 47	3065	44 3 39	3055	45 32 43	3043
	Spica E.	88 46 18	2759	87 10 56	2750	85 35 22	2740	83 59 35	2731
3	Sun W.	53 1 35	2988	54 32 3	2977	56 2 45	2965	57 33 42	2953
	Spica E.	75 57 35	2684	74 20 33	2675	72 43 19	2664	71 5 51	2655
4	Sun W.	65 12 9	2894	66 44 35	2881	68 17 18	2870	69 50 15	2857
	Pollux W.	28 2 45	2685	29 39 46	2662	31 17 17	2641	32 55 16	2621
	Spica E.	62 55 20	2607	61 16 34	2598	59 37 36	2588	57 58 24	2579
	Antares E.	108 49 40	2609	107 10 57	2598	105 31 59	2585	103 52 44	2574
5	Sun W.	77 39 3	2795	79 13 38	2782	80 48 29	2770	82 23 36	2757
	Pollux W.	41 11 34	2535	42 51 59	2520	44 32 45	2504	46 13 53	2489
	Spica E.	49 39 17	2534	47 58 51	2525	46 18 13	2518	44 37 25	2510
	Antares E.	95 32 27	2515	93 51 35	2503	92 10 26	2491	90 29 0	2480
	Saturn E.	113 12 57	2450	111 30 33	2438	109 47 53	2426	108 4 56	2414
6	Sun W.	90 23 27	2693	92 0 17	2680	93 37 23	2668	95 14 46	2655
	Pollux W.	54 44 34	2419	56 27 41	2405	58 11 8	2393	59 54 53	2380
	Regulus W.	18 45 31	2423	20 28 33	2405	22 12 0	2388	23 55 53	2372
	Spica E.	36 11 6	2484	34 29 30	2482	32 47 51	2482	31 6 12	2484
	Antares E.	81 57 47	2421	80 14 43	2410	78 31 23	2399	76 47 47	2388
	Saturn E.	99 26 0	2357	97 41 23	2344	95 56 28	2333	94 11 16	2321
7	Sun W.	103 25 57	2593	105 5 1	2581	106 44 22	2569	108 23 59	2558
	Pollux W.	68 38 16	2317	70 23 51	2306	72 9 42	2294	73 55 51	2282
	Regulus W.	32 40 38	2302	34 26 34	2289	36 12 50	2277	37 59 23	2266
	Spica E.	22 40 7	2551	21 0 5	2586	19 20 51	2636	17 42 45	2706
	Antares E.	68 5 53	2335	66 20 45	2326	64 35 23	2317	62 49 48	2307
	Saturn E.	85 21 3	2264	83 34 10	2253	81 47 1	2242	79 59 36	2231
	α Aquilæ E.	112 42 20	3037	111 12 53	3008	109 42 50	2981	108 12 13	2955
8	Sun W.	116 45 58	2503	118 27 7	2493	120 8 30	2484	121 50 6	2474
	Pollux W.	82 50 39	2229	84 38 23	2220	86 26 21	2210	88 14 33	2201
	Regulus W.	46 56 23	2210	48 44 35	2200	50 33 2	2191	52 21 43	2181
	Antares E.	53 58 40	2268	52 11 53	2262	50 24 57	2257	48 37 54	2252
	Saturn E.	70 58 33	2180	69 9 35	2170	67 20 23	2161	65 30 57	2153
	α Aquilæ E.	100 31 47	2852	98 58 27	2836	97 24 46	2822	95 50 47	2809
9	Sun W.	130 21 16	2434	132 4 3	2427	133 47 0	2421	135 30 5	2415
	Pollux W.	97 18 43	2163	99 8 7	2157	100 57 40	2151	102 47 22	2145
	Regulus W.	61 28 29	2141	63 18 26	2134	65 8 33	2128	66 58 50	2122
	Antares E.	39 41 20	2245	37 53 59	2248	36 6 42	2252	34 19 31	2259
	Saturn E.	56 20 38	2113	54 29 59	2107	52 39 11	2101	50 48 13	2096
	α Aquilæ E.	87 57 14	2766	86 22 2	2762	84 46 44	2760	83 11 23	2759
10	Regulus W.	76 12 14	2100	78 3 13	2097	79 54 16	2095	81 45 23	2094
	Antares E.	25 27 53	2351	23 43 10	2390	21 59 21	2441	20 16 44	2506
	Saturn E.	41 31 29	2075	39 39 51	2072	37 48 8	2070	35 56 23	2068
	α Aquilæ E.	75 15 10	2782	73 40 18	2793	72 5 41	2806	70 31 20	2821
	Fomalhaut E.	108 18 38	2323	106 33 12	2316	104 47 36	2310	103 1 52	2305



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
11	Regulus W.	83 36 32	2092	85 27 43	2092	87 18 54	2092	89 10 5	2094
	Spica W.	30 17 20	2220	32 5 17	2207	33 53 34	2196	35 42 8	2188
	Saturn E.	34 4 35	2068	32 12 46	2068	30 20 57	2068	28 29 8	2069
	$\alpha$ Aquilæ E.	68 57 19	2388	67 23 40	2359	65 50 28	2382	64 17 46	2308
	Fomalhaut E.	101 16 0	2302	99 30 4	2299	97 44 3	2297	95 57 59	2297
12	$\alpha$ Pegasi E.	116 25 37	2581	114 46 16	2566	113 6 35	2553	111 26 36	2542
	Regulus W.	98 25 21	2107	100 16 10	2111	102 6 52	2116	103 57 26	2122
	Spica W.	44 47 14	2170	46 36 26	2170	48 25 38	2172	50 14 48	2175
	$\alpha$ Aquilæ E.	56 43 58	2394	55 15 41	2344	53 48 24	2300	52 22 14	2262
	Fomalhaut E.	87 7 59	2309	85 22 13	2315	83 36 35	2322	81 51 7	2329
13	$\alpha$ Pegasi E.	103 3 44	2515	101 22 51	2514	99 41 57	2515	98 1 4	2517
	Spica W.	59 19 10	2201	61 7 37	2209	62 55 51	2217	64 43 53	2226
	Antares W.	14 58 39	2816	16 32 46	2698	18 9 29	2613	19 48 7	2552
	Fomalhaut E.	73 7 3	2384	71 23 5	2398	69 39 27	2413	67 56 10	2430
	$\alpha$ Pegasi E.	89 38 2	2548	87 57 55	2558	86 18 2	2569	84 38 25	2582
14	Spica W.	73 40 22	2281	75 26 49	2294	77 12 58	2307	78 58 47	2320
	Antares W.	28 15 55	2429	29 58 49	2423	31 41 51	2420	33 24 57	2421
	Fomalhaut E.	59 26 18	2532	57 45 49	2557	56 5 55	2583	54 26 37	2612
	$\alpha$ Pegasi E.	76 25 17	2665	74 47 51	2685	73 10 51	2708	71 34 22	2731
	$\alpha$ Arietis E.	119 26 37	2440	117 43 59	2447	116 1 31	2455	114 19 14	2464
15	Spica W.	87 42 44	2395	89 26 26	2412	91 9 44	2427	92 52 40	2444
	Antares W.	41 59 12	2453	43 41 31	2463	45 23 36	2474	47 5 25	2487
	Saturn W.	24 26 44	2340	26 11 45	2355	27 56 24	2372	29 40 39	2387
	Fomalhaut E.	46 20 37	2785	44 45 50	2828	43 11 59	2875	41 39 8	2925
	$\alpha$ Pegasi E.	63 40 12	2870	62 7 15	2903	60 34 59	2937	59 3 27	2974
16	$\alpha$ Arietis E.	105 51 25	2521	104 10 41	2535	102 30 17	2549	100 50 12	2564
	Venus E.	112 30 33	2729	110 54 32	2747	109 18 55	2765	107 43 41	2783
	Spica W.	101 21 18	2530	103 1 49	2548	104 41 55	2567	106 21 36	2585
	Antares W.	55 29 59	2553	57 9 56	2571	58 49 31	2586	60 28 45	2601
	Saturn W.	38 16 5	2472	39 57 58	2489	41 39 27	2506	43 20 32	2523
17	$\alpha$ Pegasi E.	51 38 9	3193	50 11 51	3246	48 46 36	3302	47 22 27	3362
	$\alpha$ Arietis E.	92 35 3	2644	90 57 8	2662	89 19 37	2679	87 42 29	2696
	Venus E.	99 53 27	2876	98 20 37	2894	96 48 11	2913	95 16 9	2932
	Mars E.	120 14 16	2741	118 38 30	2758	117 3 7	2776	115 28 8	2795
	Sun E.	141 36 41	2820	140 2 39	2838	138 29 0	2856	136 55 45	2874
18	Spica W.	68 39 35	2681	70 16 40	2698	71 53 23	2714	73 29 45	2729
	Saturn W.	51 39 59	2610	53 18 41	2626	54 57 1	2643	56 34 57	2660
	$\alpha$ Pegasi E.	40 40 36	3745	39 24 37	3843	38 10 19	3951	36 57 50	4070
	$\alpha$ Arietis E.	79 42 49	2789	78 8 7	2808	76 33 49	2828	74 59 57	2846
	Venus E.	87 42 0	3027	86 12 21	3046	84 43 5	3064	83 14 12	3083
19	Mars E.	107 39 5	2884	106 6 26	2902	104 34 10	2920	103 2 16	2937
	Sun E.	129 15 19	2966	127 44 24	2984	126 13 51	3002	124 43 41	3020
	Antares W.	81 26 20	2808	83 0 37	2823	84 34 35	2838	86 8 13	2853
	Saturn W.	64 39 9	2741	66 14 55	2756	67 50 21	2770	69 25 28	2786
	$\alpha$ Aquilæ W.	43 20 22	4379	44 26 2	4305	45 32 50	4238	46 40 40	4179
20	$\alpha$ Arietis E.	67 16 48	2945	65 45 26	2965	64 14 29	2985	62 43 58	3005



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
11	Regulus W.	91 1 14 2095	92 52 22 2097	94 43 26 2100	96 34 26 2103				
	Spica W.	37 30 54 2181	39 19 50 2176	41 8 54 2173	42 58 2 2171				
	Saturn E.	26 37 21 2070	24 45 36 2073	22 53 56 2076	21 2 20 2080				
	$\alpha$ Aquilæ E.	62 45 37 2038	61 14 6 2070	59 43 15 3007	58 13 11 3048				
	Fomalhaut E.	94 11 55 2297	92 25 51 2299	90 39 50 2301	88 53 52 2304				
12	$\alpha$ Pegasi E.	109 46 22 2533	108 5 55 2526	106 25 18 2521	104 44 34 2517				
	Regulus W.	105 47 51 2129	107 38 6 2136	109 28 10 2143	111 18 3 2152				
	Spica W.	52 3 53 2178	53 52 54 2183	55 41 47 2188	57 30 33 2194				
	$\alpha$ Aquilæ E.	50 57 18 2330	49 33 41 2406	48 11 31 3490	46 50 55 3583				
	Fomalhaut E.	80 5 50 2338	78 20 45 2348	76 35 55 2358	74 51 20 2370				
13	$\alpha$ Pegasi E.	96 20 14 2520	94 39 29 2525	92 58 51 2531	91 18 21 2539				
	Spica W.	66 31 41 2236	68 19 15 2246	70 6 34 2257	71 53 36 2268				
	Antares W.	21 28 8 2508	23 9 10 2476	24 50 57 2454	26 33 15 2438				
	Fomalhaut E.	66 13 18 2448	64 30 51 2467	62 48 51 2487	61 7 19 2509				
	$\alpha$ Pegasi E.	82 59 6 2596	81 20 5 2612	79 41 26 2629	78 3 10 2646				
14	Spica W.	80 44 17 2335	82 29 26 2350	84 14 13 2364	85 58 40 2379				
	Antares W.	35 8 1 2424	36 51 2 2429	38 33 55 2435	40 16 39 2443				
	Fomalhaut E.	52 47 58 2642	51 10 0 2674	49 32 45 2709	47 56 17 2745				
	$\alpha$ Pegasi E.	69 58 23 2756	68 22 57 2782	66 48 5 2810	65 13 50 2839				
	$\alpha$ Arietis E.	112 37 10 2474	110 55 20 2485	109 13 45 2496	107 32 26 2509				
15	Spica W.	94 35 12 2461	96 17 20 2478	97 59 4 2496	99 40 23 2513				
	Antares W.	48 46 57 2499	50 28 11 2512	52 9 7 2527	53 49 43 2541				
	Saturn W.	31 24 32 2404	33 8 1 2421	34 51 6 2437	36 33 48 2455				
	Fomalhaut E.	40 7 21 2980	38 36 43 3040	37 7 20 3106	35 39 18 3179				
	$\alpha$ Pegasi E.	57 32 42 3012	56 2 45 3053	54 33 38 3097	53 5 25 3144				
16	$\alpha$ Arietis E.	99 10 27 2579	97 31 3 2595	95 52 1 2611	94 13 21 2627				
	Venus E.	106 8 51 2801	104 34 24 2819	103 0 20 2838	101 26 42 2856				
	Spica W.	108 0 52 2603	109 39 43 2621	111 18 10 2640	112 56 11 2658				
	Antares W.	62 7 38 2617	63 46 10 2633	65 24 20 2649	67 2 8 2665				
	Saturn W.	45 1 13 2540	46 41 30 2558	48 21 23 2575	50 0 53 2592				
17	$\alpha$ Pegasi E.	45 59 27 3428	44 37 42 3498	43 17 15 3573	41 58 11 3655				
	$\alpha$ Arietis E.	86 5 44 2715	84 29 24 2733	82 53 28 2751	81 17 56 2770				
	Venus E.	93 44 31 2951	92 13 17 2971	90 42 28 2989	89 12 2 3009				
	Mars E.	113 53 33 2812	112 19 21 2830	110 45 32 2848	109 12 7 2866				
	Sun E.	135 22 53 2893	133 50 25 2911	132 18 20 2929	130 46 38 2947				
18	Antares W.	75 5 46 2745	76 41 26 2762	78 16 44 2777	79 51 42 2792				
	Saturn W.	58 12 31 2676	59 49 43 2692	61 26 33 2708	63 3 2 2725				
	$\alpha$ Pegasi E.	35 47 19 4201	34 38 54 4347	33 32 45 4510	32 29 2 4695				
	$\alpha$ Arietis E.	73 26 29 2866	71 53 26 2885	70 20 48 2905	68 48 36 2924				
	Venus E.	81 45 42 3102	80 17 35 3119	78 49 49 3138	77 22 25 3155				
19	Mars E.	101 30 44 2955	99 59 35 2972	98 28 47 2989	96 58 20 3006				
	Sun E.	123 13 53 3038	121 44 27 3055	120 15 22 3073	118 46 39 3090				
	Antares W.	87 41 32 2868	89 14 32 2882	90 47 14 2896	92 19 38 2910				
20	Saturn W.	71 0 14 2800	72 34 42 2814	74 8 51 2828	75 42 42 2842				
	$\alpha$ Aquilæ W.	47 49 26 4126	48 59 2 4079	50 9 24 4038	51 20 26 4001				
	$\alpha$ Arietis E.	61 13 51 3026	59 44 11 3047	58 14 56 3068	56 46 7 3090				



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
18	Venus E.	75 55 22	3173	74 28 41	3190	73 2 20	3207	71 36 19	3223
	Mars E.	95 28 15	3022	93 58 30	3039	92 29 5	3055	91 0 0	3071
	SUN E.	117 18 17	3106	115 50 15	3123	114 22 34	3139	112 55 12	3156
19	Antares W.	93 51 44	2923	95 23 34	2937	96 55 6	2949	98 26 23	2961
	Saturn W.	77 16 15	2855	78 49 32	2869	80 22 31	2881	81 55 15	2892
	$\alpha$ Aquilæ W.	52 32 5	3967	53 44 17	3938	54 56 59	3912	56 10 7	3888
	$\alpha$ Arietis E.	55 17 45	3111	53 49 49	3133	52 22 19	3156	50 55 17	3180
	Venus E.	64 30 58	3301	63 6 48	3315	61 42 54	3329	60 19 16	3343
	Mars E.	83 39 17	3144	82 12 1	3158	80 45 1	3172	79 18 18	3184
	SUN E.	105 43 5	3231	104 17 33	3244	102 52 16	3258	101 27 16	3271
20	Saturn W.	89 35 15	2946	91 6 35	2956	92 37 43	2965	94 8 40	2974
	$\alpha$ Aquilæ W.	62 21 3	3802	63 36 3	3790	64 51 15	3779	66 6 39	3770
	$\alpha$ Arietis E.	43 47 21	3309	42 23 20	3338	40 59 52	3370	39 37 1	3403
	Venus E.	53 24 51	3404	52 2 39	3415	50 40 39	3425	49 18 51	3434
	Mars E.	72 8 20	3242	70 43 0	3253	69 17 53	3262	67 52 57	3271
	SUN E.	94 25 52	3330	93 2 15	3340	91 38 50	3350	90 15 36	3359
21	Saturn W.	101 40 51	3010	103 10 52	3016	104 40 45	3022	106 10 31	3026
	$\alpha$ Aquilæ W.	72 25 47	3736	73 41 56	3731	74 58 11	3727	76 14 29	3723
	Fomalhaut W.	37 2 51	3638	38 20 44	3606	39 39 12	3577	40 58 12	3551
	Venus E.	42 32 24	3477	41 11 34	3484	39 50 52	3490	38 30 17	3496
	Mars E.	60 50 49	3311	59 26 50	3318	58 2 59	3323	56 39 14	3329
	SUN E.	83 21 57	3398	81 59 38	3405	80 37 27	3411	79 15 23	3416
22	$\alpha$ Aquilæ W.	82 36 52	3710	83 53 28	3709	85 10 5	3708	86 26 43	3708
	Fomalhaut W.	47 39 24	3454	49 0 40	3440	50 22 11	3426	51 43 58	3413
	$\alpha$ Pegasi W.	36 4 29	4435	37 9 19	4344	38 15 31	4265	39 22 56	4194
	Venus E.	31 48 50	3519	30 28 47	3523	29 8 48	3525	27 48 52	3528
	Mars E.	49 41 56	3350	48 18 42	3352	46 55 31	3355	45 32 23	3357
	Jupiter E.	51 54 18	3162	50 27 23	3164	49 0 31	3165	47 33 40	3167
	SUN E.	72 26 21	3435	71 4 44	3438	69 43 10	3439	68 21 38	3441
23	$\alpha$ Aquilæ W.	92 50 0	3708	94 6 39	3709	95 23 16	3710	96 39 52	3712
	Fomalhaut W.	58 36 18	3358	59 59 22	3349	61 22 37	3339	62 46 4	3331
	$\alpha$ Pegasi W.	45 15 16	3919	46 28 17	3877	47 42 0	3839	48 56 22	3802
	Mars E.	38 37 6	3360	37 14 4	3360	35 51 2	3360	34 28 0	3359
	Jupiter E.	40 19 49	3170	38 53 4	3169	37 26 18	3168	35 59 30	3167
	SUN E.	61 34 9	3440	60 12 38	3439	58 51 5	3437	57 29 30	3435
24	$\alpha$ Aquilæ W.	103 2 15	3728	104 18 33	3732	105 34 46	3737	106 50 54	3744
	Fomalhaut W.	69 45 51	3287	71 10 18	3278	72 34 56	3270	73 59 43	3260
	$\alpha$ Pegasi W.	55 16 51	3654	56 34 27	3629	57 52 30	3606	59 10 58	3585
	Mars E.	27 32 34	3354	26 9 25	3354	24 46 16	3353	23 23 5	3353
	Jupiter E.	28 45 3	3157	27 18 2	3154	25 50 58	3152	24 23 52	3150
	SUN E.	50 40 47	3416	49 18 49	3412	47 56 46	3407	46 34 37	3401
25	Fomalhaut W.	81 6 8	3219	82 31 55	3211	83 57 51	3203	85 23 57	3194
	$\alpha$ Pegasi W.	65 49 0	3487	67 9 39	3469	68 30 38	3453	69 51 55	3437
	$\alpha$ Arietis W.	23 9 37	4167	24 18 34	4033	25 29 41	3917	26 42 44	3817
	SUN E.	39 42 13	3369	38 19 21	3362	36 56 21	3355	35 33 13	3346



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .
		<sup>°</sup> <sup>'</sup> <sup>"</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>
18	Venus E.	70 10 37	3240	68 45 15	3255	67 20 11	3271	65 55 26
	Mars E.	89 31 15	3086	88 2 48	3101	86 34 40	3116	85 6 49
	Sun E.	111 28 10	3172	110 1 27	3187	108 35 2	3202	107 8 55
19	Antares W.	99 57 24	2973	101 28 10	2985	102 58 41	2997	104 28 57
	Saturn W.	83 27 44	2904	84 59 58	2916	86 31 57	2926	88 3 43
	α Aquilæ W.	57 23 39	3867	58 37 33	3848	59 51 46	3830	61 6 17
	α Arietis E.	49 28 44	3203	48 2 38	3228	46 37 2	3253	45 11 56
	Venus E.	58 55 54	3356	57 32 47	3369	56 9 55	3380	54 47 16
	Mars E.	77 51 50	3196	76 25 36	3209	74 59 37	3220	73 33 52
	Sun E.	100 2 31	3283	98 38 0	3296	97 13 44	3307	95 49 41
20	Saturn W.	95 39 25	2981	97 10 1	2990	98 40 26	2997	100 10 43
	α Aquilæ W.	67 22 12	3761	68 37 55	3754	69 53 45	3747	71 9 43
	α Arietis E.	38 14 48	3439	36 53 15	3478	35 32 26	3520	34 12 24
	Venus E.	47 57 13	3444	46 35 46	3454	45 14 30	3462	43 53 23
	Mars E.	66 28 12	3280	65 3 37	3288	63 39 12	3296	62 14 56
	Sun E.	88 52 33	3368	87 29 40	3377	86 6 57	3384	84 44 22
21	Saturn W.	107 40 11	3030	109 9 46	3034	110 39 16	3038	112 8 42
	α Aquilæ W.	77 30 52	3720	78 47 18	3717	80 3 47	3714	81 20 19
	Fomalhaut W.	42 17 40	3528	43 37 33	3507	44 57 50	3488	46 18 27
	Venus E.	37 9 48	3502	35 49 26	3507	34 29 9	3511	33 8 57
	Mars E.	55 15 36	3334	53 52 4	3338	52 28 37	3342	51 5 14
	Sun E.	77 53 25	3421	76 31 32	3425	75 9 44	3429	73 48 1
22	α Aquilæ W.	87 43 22	3707	89 0 2	3708	90 16 41	3707	91 33 21
	Fomalhaut W.	53 6 0	3401	54 28 16	3390	55 50 44	3379	57 13 25
	α Pegasi W.	40 31 28	4128	41 41 3	4068	42 51 36	4014	44 3 2
	Venus E.	26 28 59	3530	25 9 8	3533	23 49 20	3535	22 29 34
	Mars E.	44 9 17	3358	42 46 12	3359	41 23 9	3360	40 0 7
	Jupiter E.	46 6 52	3169	44 40 6	3169	43 13 20	3170	41 46 35
	Sun E.	67 0 7	3442	65 38 38	3441	64 17 8	3442	62 55 39
23	α Aquilæ W.	97 56 26	3714	99 12 58	3717	100 29 27	3720	101 45 53
	Fomalhaut W.	64 9 40	3321	65 33 28	3312	66 57 25	3303	68 21 33
	α Pegasi W.	50 11 22	3768	51 26 57	3737	52 43 5	3708	53 59 43
	Mars E.	33 4 57	3358	31 41 53	3358	30 18 48	3357	28 55 42
	Jupiter E.	34 32 41	3165	33 5 50	3163	31 38 57	3161	30 12 1
	Sun E.	56 7 53	3432	54 46 12	3429	53 24 28	3425	52 2 40
24	α Aquilæ W.	108 6 55	3751	109 22 49	3759	110 38 34	3767	111 54 11
	Fomalhaut W.	75 24 41	3252	76 49 48	3244	78 15 5	3236	79 40 32
	α Pegasi W.	60 29 49	3563	61 49 4	3542	63 8 42	3523	64 28 41
	Mars E.	21 59 55	3354	20 36 46	3356	19 13 39	3360	17 50 37
	Jupiter E.	22 56 43	3148	21 29 31	3148	20 2 19	3147	18 35 6
	Sun E.	45 12 22	3396	43 50 1	3389	42 27 32	3383	41 4 56
25	Fomalhaut W.	86 50 13	3187	88 16 38	3178	89 43 13	3171	91 9 57
	α Pegasi W.	71 13 30	3421	72 35 23	3407	73 57 32	3392	75 19 58
	α Arietis W.	27 57 28	3731	29 13 42	3656	30 31 16	3589	31 50 3
	Sun E.	34 9 55	3339	32 46 29	3331	31 22 53	3322	29 59 7



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1.27788	0.75155	0.10732	1.45825	113.996 <sup>a</sup>	h m s 19 17 45.65
2	1.28465	0.74321	0.10843	1.45830	113.682	19 13 49.74
3	1.29134	0.73513	0.10955	1.45834	113.359	19 9 53.82
4	1.29796	0.72736	0.11067	1.45837	113.029	19 5 57.91
5	1.30451	0.71991	0.11180	1.45839	112.691	19 2 2.00
6	1.31100	0.71280	0.11292	1.45840	112.345	18 58 6.09
7	1.31741	0.70603	0.11405	1.45840	111.992	18 54 10.18
8	1.32375	0.69964	0.11518	1.45839	111.629	18 50 14.27
9	1.33002	0.69365	0.11632	1.45838	111.259	18 46 18.35
10	1.33621	0.68808	0.11745	1.45836	110.882	18 42 22.44
11	1.34234	0.68294	0.11859	1.45833	110.497	18 38 26.53
12	1.34840	0.67825	0.11972	1.45830	110.105	18 34 30.62
13	1.35438	0.67402	0.12084	1.45825	109.707	18 30 34.71
14	1.36030	0.67027	0.12198	1.45819	109.303	18 26 38.80
15	1.36615	0.66703	0.12311	1.45812	108.891	18 22 42.88
16	1.37193	0.66430	0.12424	1.45804	108.472	18 18 46.97
17	1.37763	0.66209	0.12536	1.45796	108.047	18 14 51.06
18	1.38328	0.66040	0.12649	1.45787	107.614	18 10 55.15
19	1.38885	0.65923	0.12762	1.45777	107.175	18 6 59.24
20	1.39436	0.65860	0.12874	1.45766	106.730	18 3 3.33
21	1.39979	0.65852	0.12986	1.45754	106.279	17 59 7.41
22	1.40516	0.65897	0.13098	1.45741	105.823	17 55 11.50
23	1.41046	0.65996	0.13210	1.45727	105.360	17 51 15.59
24	1.41569	0.66147	0.13321	1.45711	104.892	17 47 19.68
25	1.42086	0.66353	0.13432	1.45695	104.417	17 43 23.77
26	1.42596	0.66611	0.13542	1.45678	103.938	17 39 27.86
27	1.43099	0.66918	0.13651	1.45661	103.453	17 35 31.94
28	1.43595	0.67277	0.13761	1.45643	102.962	17 31 36.03
29	1.44085	0.67686	0.13870	1.45624	102.466	17 27 40.12
30	1.44568	0.68137	0.13977	1.45603	101.966	17 23 44.21
31	1.45045	0.68640	0.14086	1.45581	101.461	17 19 48.30



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>s</sup> .783249.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	—0.7809	—1.2868	+8.9046	+0.5711	2404215	70	151	.4134
2	0.7590	1.2892	8.9221	0.5714	2404216	71	152	.4162
3	0.7357	1.2915	8.9390	0.5717	2404217	72	153	.4189
4	—0.7110	—1.2936	+8.9554	+0.5719	2404218	73	154	.4216
5	0.6848	1.2956	8.9712	0.5721	2404219	74	155	.4244
6	0.6567	1.2975	8.9866	0.5722	2404220	75	156	.4271
7	—0.6265	—1.2993	+9.0014	+0.5722	2404221	76	157	.4299
8	0.5940	1.3009	9.0159	0.5722	2404222	77	158	.4326
9	0.5587	1.3024	9.0299	0.5721	2404223	78	159	.4353
10	—0.5201	—1.3037	+9.0435	+0.5719	2404224	79	160	.4381
11	0.4777	1.3050	9.0568	0.5717	2404225	80	161	.4408
12	0.4306	1.3061	9.0697	0.5714	2404226	81	162	.4435
13	—0.3776	—1.3071	+9.0822	+0.5710	2404227	82	163	.4463
14	0.3171	1.3079	9.0944	0.5706	2404228	83	164	.4490
15	0.2466	1.3087	9.1063	0.5701	2404229	84	165	.4518
16	—0.1624	—1.3093	+9.1179	+0.5695	2404230	85	166	.4545
17	0.0575	1.3098	9.1292	0.5688	2404231	86	167	.4572
18	9.9190	1.3102	9.1402	0.5681	2404232	87	168	.4600
19	—9.7141	—1.3104	+9.1510	+0.5673	2404233	88	169	.4627
20	—9.3128	1.3106	9.1616	0.5664	2404234	89	170	.4654
21	+9.0284	1.3106	9.1718	0.5655	2404235	90	171	.4682
22	+9.6222	—1.3105	+9.1819	+0.5645	2404236	91	172	.4709
23	9.8640	1.3103	9.1917	0.5634	2404237	92	173	.4737
24	0.0183	1.3099	9.2013	0.5622	2404238	93	174	.4764
25	+0.1318	—1.3095	+9.2106	+0.5610	2404239	94	175	.4791
26	0.2217	1.3089	9.2198	0.5597	2404240	95	176	.4819
27	0.2959	1.3082	9.2288	0.5583	2404241	96	177	.4846
28	+0.3592	—1.3073	+9.2375	+0.5568	2404242	97	178	.4873
29	0.4144	1.3064	9.2461	0.5552	2404243	98	179	.4901
30	0.4632	1.3053	9.2545	0.5536	2404244	99	180	.4928
31	+0.5069	—1.3041	+9.2627	+0.5519	2404245	100	181	.4956

\* Add .0026 if Fraction be required for the time 1, see page 329.

\* Add .0026 if Fraction be required for the time *t*, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiameter passing the Meridian.*	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Frid.	1	6 40 51.08	10.345	N.23 7 22.1	10.09	1 8.77	3 29.62	0.488
Sat.	2	6 44 59.24	10.334	23 3 7.8	11.10	1 8.74	3 41.19	0.476
Sun.	3	6 49 7.11	10.321	22 58 29.4	12.10	1 8.70	3 52.48	0.464
Mon.	4	6 53 14.66	10.308	22 53 26.9	13.10	1 8.65	4 3.44	0.450
Tues.	5	6 57 21.87	10.293	22 48 0.4	14.10	1 8.61	4 14.06	0.435
Wed.	6	7 1 28.73	10.278	22 42 10.1	15.09	1 8.56	4 24.33	0.420
Thur.	7	7 5 35.21	10.262	22 35 56.2	16.07	1 8.51	4 34.23	0.404
Frid.	8	7 9 41.30	10.245	22 29 18.8	17.05	1 8.46	4 43.73	0.388
Sat.	9	7 13 46.97	10.227	22 22 18.0	18.01	1 8.40	4 52.83	0.370
Sun.	10	7 17 52.22	10.210	22 14 54.1	18.97	1 8.34	5 1.50	0.352
Mon.	11	7 21 57.04	10.191	22 7 7.3	19.92	1 8.28	5 9.73	0.334
Tues.	12	7 26 1.41	10.172	21 58 57.6	20.87	1 8.22	5 17.52	0.315
Wed.	13	7 30 5.31	10.153	21 50 25.4	21.81	1 8.16	5 24.84	0.295
Thur.	14	7 34 8.74	10.133	21 41 30.8	22.74	1 8.09	5 31.70	0.276
Frid.	15	7 38 11.69	10.112	21 32 14.0	23.66	1 8.02	5 38.08	0.255
Sat.	16	7 42 14.14	10.092	21 22 35.1	24.57	1 7.95	5 43.96	0.235
Sun.	17	7 46 16.10	10.071	21 12 34.4	25.48	1 7.88	5 49.34	0.214
Mon.	18	7 50 17.55	10.050	21 2 12.2	26.37	1 7.80	5 54.22	0.193
Tues.	19	7 54 18.48	10.028	20 51 28.6	27.26	1 7.72	5 58.58	0.172
Wed.	20	7 58 18.89	10.006	20 40 23.8	28.14	1 7.64	6 2.42	0.149
Thur.	21	8 2 18.76	9.983	20 28 58.1	29.00	1 7.56	6 5.72	0.126
Frid.	22	8 6 18.08	9.960	20 17 11.7	29.86	1 7.48	6 8.48	0.104
Sat.	23	8 10 16.85	9.937	20 5 4.8	30.71	1 7.40	6 10.69	0.080
Sun.	24	8 14 15.06	9.914	19 52 37.8	31.54	1 7.32	6 12.34	0.057
Mon.	25	8 18 12.70	9.890	19 39 50.9	32.36	1 7.23	6 13.41	0.033
Tues.	26	8 22 9.76	9.865	19 26 44.4	33.18	1 7.15	6 13.92	0.009
Wed.	27	8 26 6.23	9.840	19 13 18.4	33.98	1 7.06	6 13.84	0.016
Thur.	28	8 30 2.10	9.815	18 59 33.4	34.77	1 6.98	6 13.15	0.041
Frid.	29	8 33 57.37	9.790	18 45 29.6	35.54	1 6.90	6 11.87	0.066
Sat.	30	8 37 52.02	9.764	18 31 7.3	36.31	1 6.81	6 9.98	0.092
Sun.	31	8 41 46.06	9.739	18 16 26.6	37.07	1 6.73	6 7.47	0.118
Mon.	32	8 45 39.47	9.713	N.18 1 28.1	37.81	1 6.64	6 4.33	0.144

\* Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subtracted from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
Frid.	1	<sup>h</sup> 6 40 <sup>m</sup> 50 <sup>s</sup> 48	<sup>°</sup> N. 23 <sup>'</sup> 7 <sup>"</sup> 22.7	<sup>'</sup> 15 46.0	<sup>m</sup> 3 29.59	<sup>h</sup> 6 37 <sup>m</sup> 20 <sup>s</sup> 89
Sat.	2	6 44 58.61	23 3 8.5	15 46.0	3 41.16	6 41 17.45
Sun.	3	6 49 6.45	22 58 30.2	15 46.0	3 52.45	6 45 14.00
Mon.	4	6 53 13.97	22 53 27.8	15 46.0	4 3.41	6 49 10.56
Tues.	5	6 57 21.15	22 48 1.4	15 46.0	4 14.03	6 53 7.12
Wed.	6	7 1 27.98	22 42 11.3	15 46.0	4 24.30	6 57 3.68
Thur.	7	7 5 34.43	22 35 57.5	15 46.1	4 34.20	7 1 0.23
Frid.	8	7 9 40.49	22 29 20.1	15 46.1	4 43.70	7 4 56.79
Sat.	9	7 13 46.14	22 22 19.5	15 46.1	4 52.80	7 8 53.34
Sun.	10	7 17 51.37	22 14 55.7	15 46.2	5 1.47	7 12 49.90
Mon.	11	7 21 56.16	22 7 9.0	15 46.2	5 9.70	7 16 46.46
Tues.	12	7 26 0.51	21 58 59.5	15 46.2	5 17.49	7 20 43.02
Wed.	13	7 30 4.40	21 50 27.4	15 46.3	5 24.81	7 24 39.58
Thur.	14	7 34 7.81	21 41 32.9	15 46.3	5 31.67	7 28 36.14
Frid.	15	7 38 10.74	21 32 16.2	15 46.4	5 38.05	7 32 32.69
Sat.	16	7 42 13.18	21 22 37.5	15 46.4	5 43.93	7 36 29.25
Sun.	17	7 46 15.13	21 12 36.9	15 46.5	5 49.32	7 40 25.81
Mon.	18	7 50 16.56	21 2 14.8	15 46.5	5 54.20	7 44 22.36
Tues.	19	7 54 17.48	20 51 31.3	15 46.6	5 58.56	7 48 18.92
Wed.	20	7 58 17.88	20 40 26.6	15 46.7	6 2.40	7 52 15.48
Thur.	21	8 2 17.74	20 29 1.0	15 46.8	6 5.71	7 56 12.03
Frid.	22	8 6 17.05	20 17 14.7	15 46.8	6 8.46	8 0 8.59
Sat.	23	8 10 15.82	20 5 7.9	15 46.9	6 10.67	8 4 5.15
Sun.	24	8 14 14.03	19 52 41.1	15 47.0	6 12.33	8 8 1.70
Mon.	25	8 18 11.67	19 39 54.3	15 47.1	6 13.41	8 11 58.26
Tues.	26	8 22 8.73	19 26 47.8	15 47.2	6 13.92	8 15 54.81
Wed.	27	8 26 5.20	19 13 22.0	15 47.3	6 13.84	8 19 51.36
Thur.	28	8 30 1.08	18 59 37.0	15 47.4	6 13.16	8 23 47.92
Frid.	29	8 33 56.36	18 45 33.3	15 47.5	6 11.88	8 27 44.48
Sat.	30	8 37 51.02	18 31 11.0	15 47.6	6 9.99	8 31 41.03
Sun.	31	8 41 45.07	18 16 30.4	15 47.8	6 7.48	8 35 37.59
Mon.	32	8 45 38.49	N. 18 1 31.9	15 47.9	6 4.35	8 39 34.14

\* The Semidiameter for *Apparent* Noon may be assumed the same as that for *Mean* Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S		Logarithm of the Radius Vector of the Earth.	THE MOON'S					
	Apparent								
	Longitude.	Latitude.		Semidiameter.	Horizontal Parallax.				
Noon.	Noon.	Noon.	Noon.	Midnight.	Noon.	Midnight.			
1	99 22 56.5	S.0°07	0°0072125	15 36.2	15 40.2	57 9.9	57 24.7		
2	100 20 9.7	N.0°05	0°0072126	15 44.2	15 48.0	57 39.2	57 53.3		
3	101 17 22.7	0°16	0°0072102	15 51.7	15 55.3	58 6.9	58 20.0		
4	102 14 35.3	0°24	0°0072055	15 58.7	16 2.0	58 32.6	58 44.6		
5	103 11 47.7	0°30	0°0071985	16 5.1	16 8.0	58 55.9	59 6.4		
6	104 9 0.0	0°32	0°0071893	16 10.6	16 12.9	59 15.9	59 24.3		
7	105 6 12.0	0°31	0°0071781	16 14.8	16 16.3	59 31.3	59 36.8		
8	106 3 23.9	0°27	0°0071650	16 17.3	16 17.7	59 40.4	59 42.0		
9	107 0 35.8	0°20	0°0071503	16 17.6	16 16.8	59 41.5	59 38.6		
10	107 57 47.6	N.0°09	0°0071340	16 15.3	16 13.1	59 33.1	59 25.1		
11	108 54 59.6	S.0°03	0°0071163	16 10.2	16 6.7	59 14.6	59 1.6		
12	109 52 11.8	0°16	0°0070972	16 2.5	15 57.8	58 46.3	58 29.1		
13	110 49 24.2	0°29	0°0070767	15 52.6	15 47.0	58 10.1	57 49.7		
14	111 46 36.9	0°42	0°0070547	15 41.2	15 35.3	57 28.4	57 6.6		
15	112 43 50.1	0°52	0°0070313	15 29.3	15 23.4	56 44.7	56 23.0		
16	113 41 3.8	0°61	0°0070064	15 17.7	15 12.3	56 2.1	55 42.3		
17	114 38 18.1	0°68	0°0069800	15 7.2	15 2.7	55 23.9	55 7.3		
18	115 35 33.1	0°72	0°0069519	14 58.7	14 55.3	54 52.6	54 40.0		
19	116 32 48.8	0°74	0°0069220	14 52.5	14 50.4	54 29.8	54 22.1		
20	117 30 5.3	0°73	0°0068903	14 48.9	14 48.2	54 16.9	54 14.3		
21	118 27 22.7	0°69	0°0068566	14 48.2	14 48.9	54 14.3	54 16.9		
22	119 24 41.0	0°64	0°0068209	14 50.4	14 52.4	54 22.0	54 29.4		
23	120 22 0.1	0°57	0°0067830	14 55.0	14 58.2	54 39.1	54 50.9		
24	121 19 20.2	0°47	0°0067429	15 2.0	15 6.1	55 4.5	55 19.7		
25	122 16 41.2	0°36	0°0067005	15 10.6	15 15.5	55 36.3	55 54.0		
26	123 14 3.0	0°24	0°0066557	15 20.5	15 25.6	56 12.4	56 31.3		
27	124 11 25.7	S.0°11	0°0066085	15 30.8	15 35.9	56 50.2	57 8.9		
28	125 8 49.2	N.0°02	0°0065588	15 40.9	15 45.6	57 27.1	57 44.4		
29	126 6 13.5	0°14	0°0065066	15 50.0	15 54.1	58 0.7	58 15.7		
30	127 3 38.5	0°26	0°0064519	15 57.8	16 1.1	58 29.2	58 41.1		
31	128 1 4.2	0°34	0°0063948	16 3.9	16 6.2	58 51.4	59 0.0		
32	128 58 30.6	N.0°40	0°0063354	16 8.1	16 9.6	59 7.0	59 12.4		



## MEAN TIME.

## THE MOON'S

		THE MOON'S									
Day of the Week.	Day of the Month.	Longitude.		Latitude.		Age.	Meridian Passage.				
		Noon.	Midnight.	Noon.	Midnight.	Noon.					
Frid.	1	129 32 28.8	136 10 34.8	N. 1 50 23.5	N. 2 23 59.8	2.5	2 17.6				
Sat.	2	142 52 3.2	149 36 51.7	2 55 55.1	3 20 39.4	3.5	3 10.2				
Sun.	3	156 24 57.6	163 16 16.7	3 52 44.4	4 16 42.7	4.5	4 1.6				
Mon.	4	170 10 43.7	177 8 12.1	4 37 8.8	4 53 40.2	5.5	4 51.9				
Tues.	5	184 8 33.7	191 11 37.4	5 5 56.7	5 13 42.4	6.5	5 41.6				
Wed.	6	198 17 10.1	205 24 55.4	5 16 45.2	5 14 57.4	7.5	6 31.7				
Thur.	7	212 34 34.1	219 45 43.3	5 8 16.4	4 56 45.2	8.5	7 23.1				
Frid.	8	226 57 57.1	234 10 46.1	4 40 32.3	4 19 51.8	9.5	8 16.5				
Sat.	9	241 23 37.8	248 35 58.7	3 55 3.8	3 26 33.6	10.5	9 12.5				
Sun.	10	255 47 13.1	262 56 44.6	2 54 51.1	2 20 30.5	11.5	10 10.7				
Mon.	11	270 3 57.6	277 8 17.9	1 44 9.0	N. 1 6 25.2	12.5	11 10.1				
Tues.	12	284 9 14.2	291 6 17.9	N. 0 27 58.6	S. 0 10 31.9	13.5	12 9.1				
Wed.	13	297 59 4.8	304 47 16.1	S. 0 48 29.7	1 25 20.2	14.5	13 5.8				
Thur.	14	311 30 37.6	318 9 0.7	2 0 32.6	2 33 40.0	15.5	13 59.2				
Frid.	15	324 42 22.6	331 10 46.2	3 4 19.5	3 32 12.5	16.5	14 49.0				
Sat.	16	337 34 19.2	343 53 14.4	3 57 4.0	4 18 43.0	17.5	15 35.5				
Sun.	17	350 7 49.2	356 18 25.0	4 37 1.4	4 51 54.1	18.5	16 19.3				
Mon.	18	2 25 26.5	8 29 21.5	5 3 17.9	5 11 12.1	19.5	17 1.5				
Tues.	19	14 30 40.1	20 29 54.3	5 15 36.9	5 16 34.1	20.5	17 43.0				
Wed.	20	26 27 37.6	32 24 24.1	5 14 6.1	5 8 16.5	21.5	18 24.6				
Thur.	21	38 20 48.5	44 17 25.7	4 59 9.5	4 46 49.8	22.5	19 7.4				
Frid.	22	50 14 49.7	56 13 34.1	4 31 23.6	4 12 57.2	23.5	19 52.0				
Sat.	23	62 14 10.6	68 17 9.7	3 51 38.5	3 27 36.9	24.5	20 39.1				
Sun.	24	74 22 59.3	80 32 5.1	3 1 3.1	2 32 9.9	25.5	21 28.9				
Mon.	25	86 44 49.2	93 1 30.5	2 1 12.5	1 28 28.3	26.5	22 21.1				
Tues.	26	99 22 24.3	105 47 41.3	S. 0 54 17.3	S. 0 19 2.4	27.5	23 15.0				
Wed.	27	112 17 27.9	118 51 45.9	N. 0 16 50.8	N. 0 52 54.5	28.5	6				
Thur.	28	125 30 32.1	132 13 39.0	1 28 38.4	2 3 30.6	0.0	0 9.6				
Frid.	29	139 0 54.4	145 52 1.9	2 36 58.4	3 8 28.7	1.0	1 3.7				
Sat.	30	152 46 41.7	159 44 30.8	3 37 28.7	4 3 28.0	2.0	1 56.7				
Sun.	31	166 45 4.0	173 47 54.6	4 25 57.9	4 44 33.4	3.0	2 48.4				
Mon.	32	180 52 35.4	187 58 38.7	N. 4 58 53.7	N. 5 8 42.1	4.0	3 39.0				



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 1.</b>				<b>SUNDAY 3.</b>			
0	h m s	N. 19 38 53.1	61.32	0	h m s	N. 12 45 52.2	107.63
1	8 52 19.31	19 32 41.8	62.46	1	10 38 34.39	12 35 4.2	108.37
2	8 54 37.51	19 26 23.6	63.59	2	10 40 47.18	12 24 11.7	109.11
3	8 56 55.61	19 19 58.7	64.72	3	10 42 59.86	12 13 14.9	109.83
4	8 59 13.62	19 13 27.0	65.84	4	10 45 12.43	12 2 13.7	110.56
5	9 1 31.54	19 6 48.6	66.96	5	10 47 24.89	11 51 8.2	111.27
6	9 3 49.36	19 0 3.5	68.07	6	10 49 37.24	11 39 58.5	111.97
7	9 6 7.09	18 53 11.8	69.17	7	10 51 49.49	11 28 44.6	112.65
8	9 8 24.71	18 46 13.5	70.27	8	10 54 1.64	11 17 26.7	113.32
9	9 10 42.23	18 39 8.6	71.35	9	10 56 13.68	11 6 4.8	113.98
10	9 12 59.65	18 31 57.3	72.43	10	10 58 25.63	10 54 38.9	114.64
11	9 15 16.97	18 24 39.4	73.51	11	11 0 37.47	10 43 9.1	115.29
12	9 17 34.17	18 17 15.1	74.58	12	11 2 49.22	10 31 35.4	115.93
13	9 19 51.27	18 9 44.4	75.64	13	11 5 0.87	10 19 58.0	116.55
14	9 22 8.25	18 2 7.4	76.70	14	11 7 12.43	10 8 16.8	117.17
15	9 24 25.12	17 54 24.0	77.75	15	11 9 23.90	9 56 32.0	117.76
16	9 26 41.88	17 46 34.4	78.79	16	11 11 35.28	9 44 43.7	118.35
17	9 28 58.53	17 38 38.5	79.82	17	11 13 46.58	9 32 51.8	118.94
18	9 31 15.06	17 30 36.5	80.85	18	11 15 57.80	9 20 56.4	119.51
19	9 33 31.47	17 22 28.3	81.87	19	11 18 8.93	9 8 57.7	120.07
20	9 35 47.76	17 14 14.1	82.88	20	11 20 19.98	8 56 55.6	120.62
21	9 38 3.94	17 5 53.8	83.88	21	11 22 30.96	8 44 50.2	121.16
22	9 40 19.99	16 57 27.5	84.87	22	11 24 41.86	8 32 41.7	121.68
23	9 42 35.92	N. 16 48 55.3	85.85	23	11 26 52.70	N. 8 20 30.0	122.20
<b>SATURDAY 2.</b>				<b>MONDAY 4.</b>			
0	9 44 51.73	N. 16 40 17.3	86.83	0	11 31 14.15	N. 8 15.3	122.70
1	9 47 7.42	16 31 33.4	87.80	1	11 33 24.78	7 55 57.6	123.20
2	9 49 22.98	16 22 43.7	88.77	2	11 35 35.36	7 43 36.9	123.69
3	9 51 38.43	16 13 48.2	89.72	3	11 37 45.87	7 31 13.3	124.16
4	9 53 53.75	16 4 47.1	90.66	4	11 39 56.33	7 18 47.0	124.62
5	9 56 8.94	15 55 40.3	91.60	5	11 42 6.74	7 6 17.9	125.07
6	9 58 24.01	15 46 27.9	92.53	6	11 44 17.09	6 53 46.2	125.51
7	10 0 38.96	15 37 10.0	93.44	7	11 46 27.40	6 41 11.8	125.94
8	10 2 53.78	15 27 46.6	94.35	8	11 48 37.67	6 28 34.9	126.35
9	10 5 8.48	15 18 17.8	95.25	9	11 50 47.89	6 15 55.6	126.76
10	10 7 23.05	15 8 43.6	96.14	10	11 52 58.08	6 3 13.8	127.16
11	10 9 37.50	14 59 4.1	97.02	11	11 55 8.23	5 50 29.7	127.54
12	10 11 51.83	14 49 19.4	97.89	12	11 57 18.35	5 37 43.4	127.91
13	10 14 6.04	14 39 29.4	98.76	13	11 59 28.44	5 24 54.8	128.27
14	10 16 20.12	14 29 34.3	99.61	14	12 1 38.51	5 12 4.1	128.62
15	10 18 34.08	14 19 34.1	100.46	15	12 3 48.55	4 59 11.4	128.96
16	10 20 47.92	14 9 28.8	101.29	16	12 5 58.58	4 46 16.6	129.29
17	10 23 1.64	13 59 18.6	102.12	17	12 8 8.59	4 33 19.9	129.60
18	10 25 15.24	13 49 3.4	102.93	18	12 10 18.59	4 20 21.4	129.90
19	10 27 28.72	13 38 43.4	103.74	19	12 12 28.58	4 7 21.1	130.19
20	10 29 42.09	13 28 18.5	104.54	20	12 14 38.56	3 54 19.1	130.47
21	10 31 55.34	13 17 48.9	105.33	21	12 16 48.54	3 41 15.4	130.74
22	10 34 8.47	13 7 14.6	106.10	22	12 18 58.53	3 28 10.2	130.99
23	10 36 21.48	12 56 35.7	106.87	23	12 21 8.52	3 15 3.5	131.24
24	10 38 34.39	N. 12 45 52.2	107.63	24	12 23 18.51	N. 3 1 55.3	131.48



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 5.</b>				<b>THURSDAY 7.</b>			
0	12 23 18.51	N. 3 1 55.3	131.48	0	14 8 36.99	S. 7 32 39.5	128.03
1	12 25 28.52	2 48 45.8	131.69	1	14 10 51.70	7 45 26.5	127.63
2	12 27 38.54	2 35 35.0	131.90	2	14 13 6.59	7 58 11.1	127.23
3	12 29 48.57	2 22 23.0	132.10	3	14 15 21.66	8 10 53.3	126.82
4	12 31 58.63	2 9 9.8	132.29	4	14 17 36.92	8 23 32.9	126.38
5	12 34 8.72	1 55 55.5	132.46	5	14 19 52.37	8 36 9.8	125.93
6	12 36 18.83	1 42 40.3	132.62	6	14 22 8.01	8 48 44.0	125.47
7	12 38 28.98	1 29 24.1	132.77	7	14 24 23.85	9 1 15.4	124.98
8	12 40 39.16	1 16 7.1	132.90	8	14 26 39.88	9 13 43.8	124.49
9	12 42 49.38	1 2 49.3	133.03	9	14 28 56.11	9 26 9.3	124.00
10	12 44 59.65	0 49 30.7	133.15	10	14 31 12.55	9 38 31.8	123.48
11	12 47 9.96	0 36 11.5	133.24	11	14 33 29.19	9 50 51.1	122.94
12	12 49 20.32	0 22 51.8	133.33	12	14 35 46.04	10 3 7.1	122.39
13	12 51 30.74	N. 0 9 31.6	133.41	13	14 38 3.10	10 15 19.8	121.83
14	12 53 41.21	S. 0 3 49.1	133.47	14	14 40 20.36	10 27 29.1	121.26
15	12 55 51.74	0 17 10.1	133.53	15	14 42 37.84	10 39 34.9	120.68
16	12 58 2.34	0 30 31.4	133.57	16	14 44 55.54	10 51 37.2	120.08
17	13 0 13.01	0 43 52.9	133.59	17	14 47 13.46	11 3 35.8	119.45
18	13 2 23.75	0 57 14.5	133.60	18	14 49 31.60	11 15 30.6	118.82
19	13 4 34.56	1 10 36.1	133.61	19	14 51 49.95	11 27 21.6	118.18
20	13 6 45.46	1 23 57.8	133.60	20	14 54 8.53	11 39 8.8	117.52
21	13 8 56.43	1 37 19.3	133.57	21	14 56 27.34	11 50 51.9	116.84
22	13 11 7.49	1 50 40.6	133.53	22	14 58 46.38	12 2 30.9	116.16
23	13 13 18.65	S. 2 4 1.7	133.49	23	15 1 5.64	S. 12 14 5.8	115.46
<b>WEDNESDAY 6.</b>				<b>FRIDAY 8.</b>			
0	13 15 29.89	S. 2 17 22.5	133.43	0	15 3 25.13	S. 12 25 36.4	114.74
1	13 17 41.23	2 30 42.9	133.36	1	15 5 44.85	12 37 2.7	114.01
2	13 19 52.67	2 44 2.8	133.27	2	15 8 4.81	12 48 24.5	113.26
3	13 22 4.22	2 57 22.1	133.16	3	15 10 25.00	12 59 41.8	112.51
4	13 24 15.87	3 10 40.7	133.05	4	15 12 45.43	13 10 54.6	111.74
5	13 26 27.64	3 23 58.7	132.93	5	15 15 6.10	13 22 2.7	110.95
6	13 28 39.52	3 37 15.9	132.79	6	15 17 27.00	13 33 6.0	110.14
7	13 30 51.53	3 50 32.2	132.64	7	15 19 48.13	13 44 4.4	109.33
8	13 33 3.65	4 3 47.6	132.47	8	15 22 9.51	13 54 57.9	108.51
9	13 35 15.90	4 17 1.9	132.29	9	15 24 31.13	14 5 46.5	107.67
10	13 37 28.28	4 30 15.1	132.11	10	15 26 52.98	14 16 29.9	106.80
11	13 39 40.79	4 43 27.2	131.91	11	15 29 15.07	14 27 8.1	105.93
12	13 41 53.43	4 56 38.0	131.68	12	15 31 37.40	14 37 41.1	105.05
13	13 44 6.21	5 9 47.4	131.45	13	15 33 59.97	14 48 8.7	104.15
14	13 46 19.14	5 22 55.4	131.21	14	15 36 22.79	14 58 30.9	103.24
15	13 48 32.21	5 36 1.9	130.95	15	15 38 45.84	15 8 47.6	102.32
16	13 50 45.44	5 49 6.8	130.68	16	15 41 9.14	15 18 58.7	101.38
17	13 52 58.81	6 2 10.1	130.40	17	15 43 32.67	15 29 4.1	100.42
18	13 55 12.34	6 15 11.6	130.10	18	15 45 56.45	15 39 3.7	99.45
19	13 57 26.04	6 28 11.3	129.79	19	15 48 20.46	15 48 57.5	98.47
20	13 59 39.89	6 41 9.1	129.47	20	15 50 44.72	15 58 45.3	97.48
21	14 1 53.91	6 54 4.9	129.13	21	15 53 9.21	16 8 27.2	96.48
22	14 4 8.10	7 6 58.6	128.78	22	15 55 33.94	16 18 3.0	95.45
23	14 6 22.46	7 19 50.2	128.41	23	15 57 58.90	16 27 32.6	94.42
24	14 8 36.99	S. 7 32 39.5	128.03	24	16 0 24.10	S. 16 36 56.0	93.37



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>th</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>th</sup> .
SATURDAY 9.				MONDAY 11.			
0	<sup>h</sup> 16 <sup>m</sup> 0 <sup>s</sup> 24.10	S. 16° 36' 56.0	93.37	0	<sup>h</sup> 18 <sup>m</sup> 0 <sup>s</sup> 17.04	S. 21° 43' 9.4	30.78
1	16 2 49.54	16 46 13.1	92.31	1	18 2 49.80	21 46 9.7	29.31
2	16 5 15.21	16 55 23.7	91.23	2	18 5 22.58	21 49 1.1	27.83
3	16 7 41.11	17 4 27.9	90.15	3	18 7 55.37	21 51 43.7	26.36
4	16 10 7.24	17 13 25.6	89.06	4	18 10 28.18	21 54 17.4	24.88
5	16 12 33.59	17 22 16.6	87.94	5	18 13 1.00	21 56 42.2	23.39
6	16 15 0.18	17 31 0.9	86.82	6	18 15 33.81	21 58 58.1	21.90
7	16 17 26.99	17 39 38.4	85.68	7	18 18 6.61	22 1 5.0	20.41
8	16 19 54.01	17 48 9.1	84.54	8	18 20 39.39	22 3 3.0	18.93
9	16 22 21.26	17 56 32.9	83.38	9	18 23 12.16	22 4 52.1	17.44
10	16 24 48.73	18 4 49.7	82.22	10	18 25 44.90	22 6 32.3	15.95
11	16 27 16.41	18 12 59.5	81.03	11	18 28 17.59	22 8 3.5	14.46
12	16 29 44.30	18 21 2.1	79.83	12	18 30 50.25	22 9 25.8	12.97
13	16 32 12.40	18 28 57.5	78.63	13	18 33 22.86	22 10 39.2	11.48
14	16 34 40.71	18 36 45.7	77.41	14	18 35 55.41	22 11 43.6	10.00
15	16 37 9.23	18 44 26.5	76.18	15	18 38 27.89	22 12 39.2	8.52
16	16 39 37.94	18 51 59.9	74.95	16	18 41 0.30	22 13 25.8	7.03
17	16 42 6.85	18 59 25.9	73.70	17	18 43 32.64	22 14 3.6	5.55
18	16 44 35.95	19 6 44.3	72.43	18	18 46 4.89	22 14 32.4	4.07
19	16 47 5.25	19 13 55.1	71.17	19	18 48 37.05	22 14 52.4	2.59
20	16 49 34.73	19 20 58.3	69.89	20	18 51 9.11	22 15 3.5	1.12
21	16 52 4.39	19 27 53.8	68.60	21	18 53 41.07	22 15 5.8	0.35
22	16 54 34.23	19 34 41.5	67.30	22	18 56 12.91	22 14 59.3	1.82
23	16 57 4.24	S. 19 41 21.4	65.99	23	18 58 44.64	S. 22 14 44.0	3.28
SUNDAY 10.				TUESDAY 12.			
0	16 59 34.43	S. 19 47 53.4	64.67	0	19 1 16.24	S. 22 14 19.9	4.75
1	17 2 4.78	19 54 17.5	63.34	1	19 3 47.71	22 13 47.0	6.20
2	17 4 35.29	20 0 33.5	62.00	2	19 6 19.04	22 13 5.5	7.65
3	17 7 5.96	20 6 41.5	60.66	3	19 8 50.23	22 12 15.2	9.11
4	17 9 36.79	20 12 41.4	59.30	4	19 11 21.26	22 11 16.2	10.55
5	17 12 7.76	20 18 33.1	57.93	5	19 13 52.14	22 10 8.6	11.98
6	17 14 38.87	20 24 16.6	56.57	6	19 16 22.85	22 8 52.4	13.42
7	17 17 10.12	20 29 51.9	55.19	7	19 18 53.39	22 7 27.6	14.84
8	17 19 41.50	20 35 18.9	53.80	8	19 21 23.76	22 5 54.3	16.26
9	17 22 13.01	20 40 37.5	52.40	9	19 23 53.95	22 4 12.5	17.68
10	17 24 44.64	20 45 47.7	51.00	10	19 26 23.94	22 2 22.2	19.09
11	17 27 16.39	20 50 49.5	49.58	11	19 28 53.74	22 0 23.4	20.49
12	17 29 48.24	20 55 42.7	48.17	12	19 31 23.34	21 58 16.3	21.88
13	17 32 20.20	21 0 27.5	46.76	13	19 33 52.73	21 56 0.9	23.27
14	17 34 52.27	21 5 3.8	45.33	14	19 36 21.91	21 53 37.1	24.65
15	17 37 24.43	21 9 31.5	43.90	15	19 38 50.88	21 51 5.1	26.02
16	17 39 56.67	21 13 50.6	42.46	16	19 41 19.62	21 48 24.9	27.38
17	17 42 29.00	21 18 1.0	41.01	17	19 43 48.13	21 45 36.5	28.74
18	17 45 1.40	21 22 2.7	39.56	18	19 46 16.41	21 42 40.0	30.09
19	17 47 33.87	21 25 55.7	38.11	19	19 48 44.45	21 39 35.4	31.43
20	17 50 6.40	21 29 40.0	36.66	20	19 51 12.25	21 36 22.9	32.75
21	17 52 38.99	21 33 15.6	35.19	21	19 53 39.79	21 33 2.4	34.08
22	17 55 11.63	21 36 42.3	33.73	22	19 56 7.08	21 29 33.9	35.40
23	17 57 44.32	21 40 0.3	32.26	23	19 58 34.12	21 25 57.6	36.70
24	18 0 17.04	S. 21 43 9.4	30.78	24	20 1 0.89	S. 21 22 13.5	37.99



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
WEDNESDAY 13.				FRIDAY 15.			
0	<sup>h</sup> 20 <sup>m</sup> 1 <sup>s</sup> 0.89	S. 21 22 13.5	37.99	0	<sup>h</sup> 21 <sup>m</sup> 52 <sup>s</sup> 16.40	S. 16 11 19.6	87.03
1	20 3 27.39	21 18 21.7	39.28	1	21 54 27.16	16 2 35.2	87.76
2	20 5 53.62	21 14 22.2	40.56	2	21 56 37.58	15 53 46.4	88.48
3	20 8 19.58	21 10 15.0	41.82	3	21 58 47.65	15 44 53.4	89.18
4	20 10 45.26	21 6 0.3	43.08	4	22 0 57.39	15 35 56.2	89.88
5	20 13 10.65	21 1 38.1	44.33	5	22 3 6.80	15 26 54.8	90.57
6	20 15 35.75	20 57 8.4	45.56	6	22 5 15.87	15 17 49.4	91.23
7	20 18 0.56	20 52 31.4	46.78	7	22 7 24.60	15 8 40.0	91.89
8	20 20 25.08	20 47 47.0	48.00	8	22 9 33.01	14 59 26.7	92.54
9	20 22 49.29	20 42 55.4	49.20	9	22 11 41.08	14 50 9.5	93.18
10	20 25 13.20	20 37 56.6	50.40	10	22 13 48.83	14 40 48.5	93.81
11	20 27 36.81	20 32 50.6	51.59	11	22 15 56.25	14 31 23.8	94.42
12	20 30 0.11	20 27 37.5	52.76	12	22 18 3.34	14 21 55.4	95.02
13	20 32 23.09	20 22 17.5	53.91	13	22 20 10.11	14 12 23.5	95.62
14	20 34 45.76	20 16 50.6	55.06	14	22 22 16.56	14 2 48.0	96.20
15	20 37 8.11	20 11 16.8	56.20	15	22 24 22.69	13 53 9.1	96.77
16	20 39 30.14	20 5 36.2	57.32	16	22 26 28.51	13 43 26.8	97.33
17	20 41 51.85	19 59 48.9	58.43	17	22 28 34.01	13 33 41.2	97.88
18	20 44 13.24	19 53 55.0	59.53	18	22 30 39.20	13 23 58.3	98.42
19	20 46 34.29	19 47 54.5	60.62	19	22 32 44.08	13 14 0.2	98.94
20	20 48 55.01	19 41 47.5	61.71	20	22 34 48.65	13 4 5.0	99.45
21	20 51 15.40	19 35 34.0	62.78	21	22 36 52.92	12 54 6.8	99.96
22	20 53 35.46	19 29 14.1	63.83	22	22 38 56.88	12 44 5.5	100.46
23	20 55 55.19	S. 19 22 48.0	64.87	23	22 41 0.55	S. 12 34 1.3	100.93
THURSDAY 14.				SATURDAY 16.			
0	20 58 14.57	S. 19 16 15.6	65.91	0	22 43 3.91	S. 12 23 54.3	101.40
1	21 0 33.62	19 9 37.1	66.93	1	22 45 6.98	12 13 44.5	101.87
2	21 2 52.32	19 2 52.5	67.93	2	22 47 9.77	12 3 31.9	102.32
3	21 5 10.68	18 56 1.9	68.92	3	22 49 12.26	11 53 16.6	102.77
4	21 7 28.70	18 49 5.4	69.91	4	22 51 14.46	11 42 58.7	103.20
5	21 9 46.38	18 42 3.0	70.88	5	22 53 16.39	11 32 38.2	103.62
6	21 12 3.71	18 34 54.8	71.84	6	22 55 18.03	11 22 15.2	104.03
7	21 14 20.70	18 27 40.9	72.79	7	22 57 19.40	11 11 49.8	104.43
8	21 16 37.34	18 20 21.3	73.72	8	22 59 20.49	11 1 22.0	104.83
9	21 18 53.64	18 12 56.2	74.64	9	23 1 21.31	10 50 51.8	105.22
10	21 21 9.59	18 5 25.6	75.56	10	23 3 21.86	10 40 19.4	105.59
11	21 23 25.19	17 57 49.5	76.47	11	23 5 22.15	10 29 44.7	105.96
12	21 25 40.44	17 50 8.0	77.35	12	23 7 22.18	10 19 7.9	106.31
13	21 27 55.34	17 42 21.3	78.22	13	23 9 21.95	10 8 29.0	106.66
14	21 30 9.90	17 34 29.4	79.08	14	23 11 21.46	9 57 48.0	107.00
15	21 32 24.11	17 26 32.3	79.93	15	23 13 20.71	9 47 5.0	107.33
16	21 34 37.97	17 18 30.2	80.77	16	23 15 19.72	9 36 20.1	107.64
17	21 36 51.48	17 10 23.1	81.59	17	23 17 18.48	9 25 33.3	107.95
18	21 39 4.65	17 2 11.1	82.41	18	23 19 17.00	9 14 44.7	108.25
19	21 41 17.47	16 53 54.2	83.21	19	23 21 15.28	9 3 54.3	108.55
20	21 43 29.94	16 45 32.6	84.00	20	23 23 13.33	8 53 2.1	108.83
21	21 45 42.07	16 37 6.2	84.78	21	23 25 11.14	8 42 8.3	109.10
22	21 47 53.86	16 28 35.2	85.55	22	23 27 8.72	8 31 12.9	109.37
23	21 50 5.30	16 19 59.6	86.30	23	23 29 6.07	8 20 15.9	109.63
24	21 52 16.40	S. 16 11 19.6	87.03	24	23 31 3.20	S. 8 9 17.4	109.88



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 17.</b>				<b>TUESDAY 19.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	23 31 3.20	S. 8 9 17.4	109.88	0	1 1 34.03	N. 0 52 17.3	113.12
1	23 33 0.11	7 58 17.4	110.11	1	1 3 24.69	1 3 35.8	113.03
2	23 34 56.81	7 47 16.1	110.34	2	1 5 15.30	1 14 53.7	112.93
3	23 36 53.29	7 36 13.3	110.57	3	1 7 5.88	1 26 10.9	112.83
4	23 38 49.57	7 25 9.2	110.78	4	1 8 56.43	1 37 27.6	112.72
5	23 40 45.64	7 14 3.9	110.99	5	1 10 46.95	1 48 43.6	112.60
6	23 42 41.51	7 2 57.3	111.19	6	1 12 37.45	1 59 58.8	112.48
7	23 44 37.18	6 51 49.6	111.38	7	1 14 27.92	2 11 13.3	112.36
8	23 46 32.65	6 40 40.7	111.57	8	1 16 18.38	2 22 27.1	112.22
9	23 48 27.94	6 29 30.8	111.74	9	1 18 8.82	2 33 40.0	112.08
10	23 50 23.03	6 18 19.8	111.92	10	1 19 59.25	2 44 52.1	111.94
11	23 52 17.94	6 7 7.8	112.08	11	1 21 49.67	2 56 3.3	111.78
12	23 54 12.68	5 55 54.9	112.23	12	1 23 40.09	3 7 13.5	111.63
13	23 56 7.24	5 44 41.1	112.38	13	1 25 30.51	3 18 22.8	111.47
14	23 58 1.62	5 33 26.4	112.52	14	1 27 20.94	3 29 31.1	111.30
15	23 59 55.83	5 22 10.9	112.64	15	1 29 11.37	3 40 38.4	111.13
16	0 1 49.88	5 10 54.7	112.77	16	1 31 1.82	3 51 44.6	110.95
17	0 3 43.76	4 59 37.7	112.88	17	1 32 52.28	4 2 49.8	110.77
18	0 5 37.49	4 48 20.1	112.98	18	1 34 42.76	4 13 53.8	110.57
19	0 7 31.06	4 37 1.9	113.08	19	1 36 33.26	4 24 56.7	110.37
20	0 9 24.48	4 25 43.1	113.18	20	1 38 23.79	4 35 58.3	110.17
21	0 11 17.75	4 14 23.7	113.27	21	1 40 14.34	4 46 58.7	109.97
22	0 13 10.89	4 3 3.8	113.36	22	1 42 4.93	4 57 57.9	109.76
23	0 15 3.88	S. 3 51 43.4	113.43	23	1 43 55.56	N. 5 8 55.8	109.53
<b>MONDAY 18.</b>				<b>WEDNESDAY 20.</b>			
0	0 16 56.73	S. 3 40 22.7	113.49	0	1 45 46.22	N. 5 19 52.3	109.30
1	0 18 49.45	3 29 1.6	113.55	1	1 47 36.93	5 30 47.4	109.07
2	0 20 42.05	3 17 40.1	113.60	2	1 49 27.68	5 41 41.2	108.84
3	0 22 34.52	3 6 18.4	113.64	3	1 51 18.48	5 52 33.5	108.59
4	0 24 26.87	2 54 56.4	113.68	4	1 53 9.34	6 3 24.3	108.34
5	0 26 19.10	2 43 34.2	113.72	5	1 55 0.26	6 14 13.6	108.09
6	0 28 11.21	2 32 11.8	113.74	6	1 56 51.23	6 25 1.4	107.83
7	0 30 3.22	2 20 49.3	113.76	7	1 58 42.27	6 35 47.6	107.56
8	0 31 55.12	2 9 26.7	113.77	8	2 0 33.38	6 46 32.2	107.30
9	0 33 46.91	1 58 4.0	113.78	9	2 2 24.56	6 57 15.2	107.02
10	0 35 38.61	1 46 41.3	113.78	10	2 4 15.81	7 7 56.4	106.73
11	0 37 30.21	1 35 18.6	113.77	11	2 6 7.14	7 18 36.0	106.45
12	0 39 21.72	1 23 56.0	113.76	12	2 7 58.55	7 29 13.8	106.15
13	0 41 13.14	1 12 33.5	113.74	13	2 9 50.05	7 39 49.8	105.85
14	0 43 4.48	1 1 11.1	113.72	14	2 11 41.63	7 50 24.0	105.55
15	0 44 55.74	0 49 48.8	113.69	15	2 13 33.31	8 0 56.4	105.23
16	0 46 46.92	0 38 26.8	113.64	16	2 15 25.08	8 11 26.8	104.91
17	0 48 38.03	0 27 5.1	113.60	17	2 17 16.95	8 21 55.3	104.59
18	0 50 29.07	0 15 43.6	113.56	18	2 19 8.92	8 32 21.9	104.27
19	0 52 20.04	S. 0 4 22.4	113.50	19	2 21 0.99	8 42 46.5	103.93
20	0 54 10.95	N. 0 6 58.4	113.43	20	2 22 53.17	8 53 9.0	103.58
21	0 56 1.80	0 18 18.8	113.37	21	2 24 45.46	9 3 29.5	103.23
22	0 57 52.59	0 29 38.8	113.29	22	2 26 37.87	9 13 47.8	102.88
23	0 59 43.33	0 40 58.3	113.21	23	2 28 30.39	9 24 4.0	102.52
24	1 1 34.03	N. 0 52 17.3	113.12	24	2 30 23.03	N. 9 34 18.1	102.16



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>THURSDAY 21.</b>				<b>SATURDAY 23.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	2 30 23.03	N. 9 34 18.1	102.16	0	4 3 47.83	N. 16 50 11.5	76.82
1	2 32 15.80	9 44 29.9	101.78	1	4 5 49.72	16 57 50.3	76.11
2	2 34 8.69	9 54 39.5	101.41	2	4 7 51.86	17 5 24.8	75.40
3	2 36 1.72	10 4 46.8	101.03	3	4 9 54.24	17 12 55.1	74.68
4	2 37 54.88	10 14 51.8	100.64	4	4 11 56.86	17 20 21.0	73.95
5	2 39 48.17	10 24 54.5	100.24	5	4 13 59.73	17 27 42.5	73.22
6	2 41 41.60	10 34 54.7	99.83	6	4 16 2.85	17 34 59.6	72.48
7	2 43 35.18	10 44 52.5	99.42	7	4 18 6.21	17 42 12.2	71.72
8	2 45 28.90	10 54 47.8	99.01	8	4 20 9.83	17 49 20.2	70.96
9	2 47 22.77	11 4 40.6	98.59	9	4 22 13.69	17 56 23.7	70.20
10	2 49 16.79	11 14 30.9	98.16	10	4 24 17.80	18 3 22.6	69.43
11	2 51 10.96	11 24 18.5	97.72	11	4 26 22.17	18 10 16.8	68.64
12	2 53 5.29	11 34 3.5	97.28	12	4 28 26.79	18 17 6.3	67.86
13	2 54 59.78	11 43 45.8	96.83	13	4 30 31.66	18 23 51.1	67.06
14	2 56 54.43	11 53 25.4	96.37	14	4 32 36.79	18 30 31.0	66.24
15	2 58 49.25	12 3 2.3	95.92	15	4 34 42.17	18 37 6.0	65.43
16	3 0 44.24	12 12 36.4	95.45	16	4 36 47.80	18 43 36.2	64.61
17	3 2 39.40	12 22 7.7	94.97	17	4 38 53.69	18 50 1.4	63.78
18	3 4 34.73	12 31 36.1	94.49	18	4 40 59.84	18 56 21.6	62.94
19	3 6 30.24	12 41 1.6	94.01	19	4 43 6.24	19 2 36.7	62.10
20	3 8 25.93	12 50 24.2	93.52	20	4 45 12.90	19 8 46.8	61.25
21	3 10 21.80	12 59 43.8	93.01	21	4 47 19.81	19 14 51.7	60.38
22	3 12 17.86	13 9 0.3	92.50	22	4 49 26.98	19 20 51.4	59.51
23	3 14 14.10	N. 13 18 13.8	91.99	23	4 51 34.41	N. 19 26 45.8	58.63
<b>FRIDAY 22.</b>				<b>SUNDAY 24.</b>			
0	3 16 10.53	N. 13 27 24.2	91.47	0	4 53 42.09	N. 19 32 34.9	57.74
1	3 18 7.15	13 36 31.4	90.94	1	4 55 50.03	19 38 18.7	56.86
2	3 20 3.97	13 45 35.5	90.41	2	4 57 58.23	19 43 57.2	55.96
3	3 22 0.99	13 54 36.3	89.87	3	5 0 6.68	19 49 30.2	55.04
4	3 23 58.21	14 3 33.9	89.32	4	5 2 15.39	19 54 57.7	54.12
5	3 25 55.63	14 12 28.1	88.76	5	5 4 24.35	20 0 19.7	53.20
6	3 27 53.25	14 21 19.0	88.20	6	5 6 33.57	20 5 36.1	52.27
7	3 29 51.08	14 30 6.5	87.63	7	5 8 43.04	20 10 46.9	51.32
8	3 31 49.12	14 38 50.5	87.05	8	5 10 52.77	20 15 51.9	50.37
9	3 33 47.37	14 47 31.1	86.47	9	5 13 2.75	20 20 51.3	49.42
10	3 35 45.83	14 56 8.1	85.88	10	5 15 12.98	20 25 44.9	48.45
11	3 37 44.51	15 4 41.6	85.28	11	5 17 23.46	20 30 32.7	47.48
12	3 39 43.40	15 13 11.4	84.67	12	5 19 34.19	20 35 14.7	46.50
13	3 41 42.52	15 21 37.6	84.06	13	5 21 45.17	20 39 50.7	45.51
14	3 43 41.85	15 30 0.1	83.43	14	5 23 56.40	20 44 20.8	44.52
15	3 45 41.41	15 38 18.8	82.81	15	5 26 7.87	20 48 44.9	43.51
16	3 47 41.20	15 46 33.8	82.18	16	5 28 19.59	20 53 2.9	42.50
17	3 49 41.21	15 54 44.9	81.53	17	5 30 31.55	20 57 14.9	41.48
18	3 51 41.46	16 2 52.1	80.88	18	5 32 43.75	21 1 20.7	40.45
19	3 53 41.93	16 10 55.4	80.22	19	5 34 56.19	21 5 20.3	39.42
20	3 55 42.64	16 18 54.8	79.56	20	5 37 8.87	21 9 13.7	38.38
21	3 57 43.58	16 26 50.1	78.88	21	5 39 21.79	21 13 0.8	37.33
22	3 59 44.76	16 34 41.3	78.20	22	5 41 34.95	21 16 41.7	36.28
23	4 1 46.17	16 42 28.5	77.52	23	5 43 48.34	21 20 16.2	35.21
24	4 3 47.83	N. 16 50 11.5	76.82	24	5 46 1.95	N. 21 23 44.2	34.13



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 25.</b>				<b>WEDNESDAY 27.</b>			
0	5 46 1 <sup>h</sup> 95 <sup>m</sup>	N.21 23 44 <sup>°</sup> 2 <sup>'</sup>	34 <sup>''</sup> 13	0	7 36 30 <sup>h</sup> 65 <sup>m</sup>	N.21 53 13 <sup>°</sup> 3 <sup>'</sup>	23 <sup>''</sup> 52
1	5 48 15 <sup>h</sup> 80 <sup>m</sup>	21 27 5 <sup>°</sup> 8 <sup>'</sup>	33 <sup>''</sup> 06	1	7 38 51 <sup>h</sup> 74 <sup>m</sup>	21 50 48 <sup>°</sup> 4 <sup>'</sup>	24 <sup>''</sup> 78
2	5 50 29 <sup>h</sup> 87 <sup>m</sup>	21 30 21 <sup>°</sup> 0 <sup>'</sup>	31 <sup>''</sup> 98	2	7 41 12 <sup>h</sup> 88 <sup>m</sup>	21 48 15 <sup>°</sup> 9 <sup>'</sup>	26 <sup>''</sup> 06
3	5 52 44 <sup>h</sup> 17 <sup>m</sup>	21 33 29 <sup>°</sup> 6 <sup>'</sup>	30 <sup>''</sup> 88	3	7 43 34 <sup>h</sup> 06 <sup>m</sup>	21 45 35 <sup>°</sup> 7 <sup>'</sup>	27 <sup>''</sup> 33
4	5 54 58 <sup>h</sup> 69 <sup>m</sup>	21 36 31 <sup>°</sup> 6 <sup>'</sup>	29 <sup>''</sup> 79	4	7 45 55 <sup>h</sup> 29 <sup>m</sup>	21 42 47 <sup>°</sup> 9 <sup>'</sup>	28 <sup>''</sup> 61
5	5 57 13 <sup>h</sup> 43 <sup>m</sup>	21 39 27 <sup>°</sup> 1 <sup>'</sup>	28 <sup>''</sup> 69	5	7 48 16 <sup>h</sup> 56 <sup>m</sup>	21 39 52 <sup>°</sup> 4 <sup>'</sup>	29 <sup>''</sup> 89
6	5 59 28 <sup>h</sup> 39 <sup>m</sup>	21 42 15 <sup>°</sup> 9 <sup>'</sup>	27 <sup>''</sup> 58	6	7 50 37 <sup>h</sup> 87 <sup>m</sup>	21 36 49 <sup>°</sup> 2 <sup>'</sup>	31 <sup>''</sup> 16
7	6 1 43 <sup>h</sup> 56 <sup>m</sup>	21 44 58 <sup>°</sup> 0 <sup>'</sup>	26 <sup>''</sup> 46	7	7 52 59 <sup>h</sup> 21 <sup>m</sup>	21 33 38 <sup>°</sup> 5 <sup>'</sup>	32 <sup>''</sup> 43
8	6 3 58 <sup>h</sup> 94 <sup>m</sup>	21 47 33 <sup>°</sup> 4 <sup>'</sup>	25 <sup>''</sup> 34	8	7 55 20 <sup>h</sup> 57 <sup>m</sup>	21 30 20 <sup>°</sup> 1 <sup>'</sup>	33 <sup>''</sup> 71
9	6 6 14 <sup>h</sup> 54 <sup>m</sup>	21 50 2 <sup>°</sup> 1 <sup>'</sup>	24 <sup>''</sup> 22	9	7 57 41 <sup>h</sup> 96 <sup>m</sup>	21 26 54 <sup>°</sup> 0 <sup>'</sup>	34 <sup>''</sup> 98
10	6 8 30 <sup>h</sup> 34 <sup>m</sup>	21 52 24 <sup>°</sup> 0 <sup>'</sup>	23 <sup>''</sup> 08	10	8 0 3 <sup>h</sup> 36 <sup>m</sup>	21 23 20 <sup>°</sup> 4 <sup>'</sup>	36 <sup>''</sup> 24
11	6 10 46 <sup>h</sup> 35 <sup>m</sup>	21 54 39 <sup>°</sup> 0 <sup>'</sup>	21 <sup>''</sup> 93	11	8 2 24 <sup>h</sup> 78 <sup>m</sup>	21 19 39 <sup>°</sup> 1 <sup>'</sup>	37 <sup>''</sup> 52
12	6 13 2 <sup>h</sup> 56 <sup>m</sup>	21 56 47 <sup>°</sup> 1 <sup>'</sup>	20 <sup>''</sup> 78	12	8 4 46 <sup>h</sup> 21 <sup>m</sup>	21 15 50 <sup>°</sup> 2 <sup>'</sup>	38 <sup>''</sup> 78
13	6 15 18 <sup>h</sup> 97 <sup>m</sup>	21 58 48 <sup>°</sup> 3 <sup>'</sup>	19 <sup>''</sup> 63	13	8 7 7 <sup>h</sup> 64 <sup>m</sup>	21 11 53 <sup>°</sup> 7 <sup>'</sup>	40 <sup>''</sup> 04
14	6 17 35 <sup>h</sup> 57 <sup>m</sup>	22 0 42 <sup>°</sup> 6 <sup>'</sup>	18 <sup>''</sup> 47	14	8 9 29 <sup>h</sup> 07 <sup>m</sup>	21 7 49 <sup>°</sup> 7 <sup>'</sup>	41 <sup>''</sup> 31
15	6 19 52 <sup>h</sup> 37 <sup>m</sup>	22 2 29 <sup>°</sup> 9 <sup>'</sup>	17 <sup>''</sup> 30	15	8 11 50 <sup>h</sup> 50 <sup>m</sup>	21 3 38 <sup>°</sup> 0 <sup>'</sup>	42 <sup>''</sup> 57
16	6 22 9 <sup>h</sup> 35 <sup>m</sup>	22 4 10 <sup>°</sup> 2 <sup>'</sup>	16 <sup>''</sup> 13	16	8 14 11 <sup>h</sup> 92 <sup>m</sup>	20 59 18 <sup>°</sup> 8 <sup>'</sup>	43 <sup>''</sup> 82
17	6 24 26 <sup>h</sup> 52 <sup>m</sup>	22 5 43 <sup>°</sup> 4 <sup>'</sup>	14 <sup>''</sup> 95	17	8 16 33 <sup>h</sup> 33 <sup>m</sup>	20 54 52 <sup>°</sup> 1 <sup>'</sup>	45 <sup>''</sup> 08
18	6 26 43 <sup>h</sup> 87 <sup>m</sup>	22 7 9 <sup>°</sup> 6 <sup>'</sup>	13 <sup>''</sup> 77	18	8 18 54 <sup>h</sup> 73 <sup>m</sup>	20 50 17 <sup>°</sup> 9 <sup>'</sup>	46 <sup>''</sup> 33
19	6 29 1 <sup>h</sup> 40 <sup>m</sup>	22 8 28 <sup>°</sup> 6 <sup>'</sup>	12 <sup>''</sup> 58	19	8 21 16 <sup>h</sup> 10 <sup>m</sup>	20 45 36 <sup>°</sup> 1 <sup>'</sup>	47 <sup>''</sup> 58
20	6 31 19 <sup>h</sup> 11 <sup>m</sup>	22 9 40 <sup>°</sup> 5 <sup>'</sup>	11 <sup>''</sup> 38	20	8 23 37 <sup>h</sup> 45 <sup>m</sup>	20 40 46 <sup>°</sup> 9 <sup>'</sup>	48 <sup>''</sup> 83
21	6 33 36 <sup>h</sup> 99 <sup>m</sup>	22 10 45 <sup>°</sup> 2 <sup>'</sup>	10 <sup>''</sup> 19	21	8 25 58 <sup>h</sup> 78 <sup>m</sup>	20 35 50 <sup>°</sup> 2 <sup>'</sup>	50 <sup>''</sup> 08
22	6 35 55 <sup>h</sup> 04 <sup>m</sup>	22 11 42 <sup>°</sup> 8 <sup>'</sup>	8 <sup>''</sup> 99	22	8 28 20 <sup>h</sup> 08 <sup>m</sup>	20 30 46 <sup>°</sup> 0 <sup>'</sup>	51 <sup>''</sup> 32
23	6 38 13 <sup>h</sup> 26 <sup>m</sup>	N.22 12 33 <sup>°</sup> 1 <sup>'</sup>	7 <sup>''</sup> 78	23	8 30 41 <sup>h</sup> 33 <sup>m</sup>	N.20 25 34 <sup>°</sup> 4 <sup>'</sup>	52 <sup>''</sup> 54
<b>TUESDAY 26.</b>				<b>THURSDAY 28.</b>			
0	6 40 31 <sup>h</sup> 63 <sup>m</sup>	N.22 13 16 <sup>°</sup> 1 <sup>'</sup>	6 <sup>''</sup> 56	0	8 33 2 <sup>h</sup> 55 <sup>m</sup>	N.20 20 15 <sup>°</sup> 5 <sup>'</sup>	53 <sup>''</sup> 77
1	6 42 50 <sup>h</sup> 16 <sup>m</sup>	22 13 51 <sup>°</sup> 8 <sup>'</sup>	5 <sup>''</sup> 34	1	8 35 23 <sup>h</sup> 73 <sup>m</sup>	20 14 49 <sup>°</sup> 2 <sup>'</sup>	55 <sup>''</sup> 00
2	6 45 8 <sup>h</sup> 85 <sup>m</sup>	22 14 20 <sup>°</sup> 2 <sup>'</sup>	4 <sup>''</sup> 12	2	8 37 44 <sup>h</sup> 86 <sup>m</sup>	20 9 15 <sup>°</sup> 5 <sup>'</sup>	56 <sup>''</sup> 22
3	6 47 27 <sup>h</sup> 69 <sup>m</sup>	22 14 41 <sup>°</sup> 3 <sup>'</sup>	2 <sup>''</sup> 90	3	8 40 5 <sup>h</sup> 94 <sup>m</sup>	20 3 34 <sup>°</sup> 5 <sup>'</sup>	57 <sup>''</sup> 44
4	6 49 46 <sup>h</sup> 67 <sup>m</sup>	22 14 55 <sup>°</sup> 0 <sup>'</sup>	1 <sup>''</sup> 67	4	8 42 26 <sup>h</sup> 97 <sup>m</sup>	19 57 46 <sup>°</sup> 2 <sup>'</sup>	58 <sup>''</sup> 66
5	6 52 5 <sup>h</sup> 79 <sup>m</sup>	22 15 1 <sup>°</sup> 4 <sup>'</sup>	0 <sup>''</sup> 44	5	8 44 47 <sup>h</sup> 94 <sup>m</sup>	19 51 50 <sup>°</sup> 6 <sup>'</sup>	59 <sup>''</sup> 87
6	6 54 25 <sup>h</sup> 05 <sup>m</sup>	22 15 0 <sup>°</sup> 3 <sup>'</sup>	0 <sup>''</sup> 81	6	8 47 8 <sup>h</sup> 85 <sup>m</sup>	19 45 47 <sup>°</sup> 8 <sup>'</sup>	61 <sup>''</sup> 07
7	6 56 44 <sup>h</sup> 44 <sup>m</sup>	22 14 51 <sup>°</sup> 7 <sup>'</sup>	2 <sup>''</sup> 05	7	8 49 29 <sup>h</sup> 70 <sup>m</sup>	19 39 37 <sup>°</sup> 8 <sup>'</sup>	62 <sup>''</sup> 27
8	6 59 3 <sup>h</sup> 97 <sup>m</sup>	22 14 35 <sup>°</sup> 7 <sup>'</sup>	3 <sup>''</sup> 28	8	8 51 50 <sup>h</sup> 48 <sup>m</sup>	19 33 20 <sup>°</sup> 6 <sup>'</sup>	63 <sup>''</sup> 45
9	7 1 23 <sup>h</sup> 63 <sup>m</sup>	22 14 12 <sup>°</sup> 3 <sup>'</sup>	4 <sup>''</sup> 52	9	8 54 11 <sup>h</sup> 19 <sup>m</sup>	19 26 56 <sup>°</sup> 4 <sup>'</sup>	64 <sup>''</sup> 63
10	7 3 43 <sup>h</sup> 40 <sup>m</sup>	22 13 41 <sup>°</sup> 4 <sup>'</sup>	5 <sup>''</sup> 78	10	8 56 31 <sup>h</sup> 83 <sup>m</sup>	19 20 25 <sup>°</sup> 0 <sup>'</sup>	65 <sup>''</sup> 82
11	7 6 3 <sup>h</sup> 29 <sup>m</sup>	22 13 2 <sup>°</sup> 9 <sup>'</sup>	7 <sup>''</sup> 04	11	8 58 52 <sup>h</sup> 39 <sup>m</sup>	19 13 46 <sup>°</sup> 5 <sup>'</sup>	67 <sup>''</sup> 00
12	7 8 23 <sup>h</sup> 29 <sup>m</sup>	22 12 16 <sup>°</sup> 9 <sup>'</sup>	8 <sup>''</sup> 29	12	9 1 12 <sup>h</sup> 87 <sup>m</sup>	19 7 1 <sup>°</sup> 0 <sup>'</sup>	68 <sup>''</sup> 17
13	7 10 43 <sup>h</sup> 40 <sup>m</sup>	22 11 23 <sup>°</sup> 4 <sup>'</sup>	9 <sup>''</sup> 55	13	9 3 33 <sup>h</sup> 27 <sup>m</sup>	19 0 8 <sup>°</sup> 5 <sup>'</sup>	69 <sup>''</sup> 33
14	7 13 3 <sup>h</sup> 62 <sup>m</sup>	22 10 22 <sup>°</sup> 3 <sup>'</sup>	10 <sup>''</sup> 82	14	9 5 53 <sup>h</sup> 59 <sup>m</sup>	18 53 9 <sup>°</sup> 1 <sup>'</sup>	70 <sup>''</sup> 48
15	7 15 23 <sup>h</sup> 94 <sup>m</sup>	22 9 13 <sup>°</sup> 6 <sup>'</sup>	12 <sup>''</sup> 08	15	9 8 13 <sup>h</sup> 82 <sup>m</sup>	18 46 2 <sup>°</sup> 7 <sup>'</sup>	71 <sup>''</sup> 63
16	7 17 44 <sup>h</sup> 36 <sup>m</sup>	22 7 57 <sup>°</sup> 4 <sup>'</sup>	13 <sup>''</sup> 34	16	9 10 33 <sup>h</sup> 96 <sup>m</sup>	18 38 49 <sup>°</sup> 5 <sup>'</sup>	72 <sup>''</sup> 77
17	7 20 4 <sup>h</sup> 87 <sup>m</sup>	22 6 33 <sup>°</sup> 6 <sup>'</sup>	14 <sup>''</sup> 61	17	9 12 54 <sup>h</sup> 00 <sup>m</sup>	18 31 29 <sup>°</sup> 5 <sup>'</sup>	73 <sup>''</sup> 90
18	7 22 25 <sup>h</sup> 47 <sup>m</sup>	22 5 2 <sup>°</sup> 1 <sup>'</sup>	15 <sup>''</sup> 88	18	9 15 13 <sup>h</sup> 95 <sup>m</sup>	18 24 2 <sup>°</sup> 7 <sup>'</sup>	75 <sup>''</sup> 03
19	7 24 46 <sup>h</sup> 15 <sup>m</sup>	22 3 23 <sup>°</sup> 1 <sup>'</sup>	17 <sup>''</sup> 14	19	9 17 33 <sup>h</sup> 81 <sup>m</sup>	18 16 20 <sup>°</sup> 1 <sup>'</sup>	76 <sup>''</sup> 16
20	7 27 6 <sup>h</sup> 91 <sup>m</sup>	22 1 36 <sup>°</sup> 4 <sup>'</sup>	18 <sup>''</sup> 42	20	9 19 53 <sup>h</sup> 57 <sup>m</sup>	18 8 48 <sup>°</sup> 8 <sup>'</sup>	77 <sup>''</sup> 27
21	7 29 27 <sup>h</sup> 74 <sup>m</sup>	21 59 42 <sup>°</sup> 1 <sup>'</sup>	19 <sup>''</sup> 68	21	9 22 13 <sup>h</sup> 22 <sup>m</sup>	18 1 1 <sup>°</sup> 9 <sup>'</sup>	78 <sup>''</sup> 37
22	7 31 48 <sup>h</sup> 65 <sup>m</sup>	21 57 40 <sup>°</sup> 2 <sup>'</sup>	20 <sup>''</sup> 96	22	9 24 32 <sup>h</sup> 77 <sup>m</sup>	17 53 8 <sup>°</sup> 4 <sup>'</sup>	79 <sup>''</sup> 46
23	7 34 9 <sup>h</sup> 62 <sup>m</sup>	21 55 30 <sup>°</sup> 6 <sup>'</sup>	22 <sup>''</sup> 24	23	9 26 52 <sup>h</sup> 21 <sup>m</sup>	17 45 8 <sup>°</sup> 4 <sup>'</sup>	80 <sup>''</sup> 55
24	7 36 30 <sup>h</sup> 65 <sup>m</sup>	N.21 53 13 <sup>°</sup> 3 <sup>'</sup>	23 <sup>''</sup> 52	24	9 29 11 <sup>h</sup> 54 <sup>m</sup>	N.17 37 1 <sup>°</sup> 8 <sup>'</sup>	81 <sup>''</sup> 63



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>FRIDAY 29.</b>				<b>SUNDAY 31.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	9 29 11.54	N. 17 37 1.8	81.63	0	11 18 13.90	N. 9 18 51.8	121.78
1	9 31 30.76	17 28 48.8	82.71	1	11 20 27.22	9 6 39.4	122.34
2	9 33 49.87	17 20 29.3	83.78	2	11 22 40.43	8 54 23.7	122.88
3	9 36 8.87	17 12 3.5	84.83	3	11 24 53.55	8 42 4.8	123.42
4	9 38 27.75	17 3 31.4	85.88	4	11 27 6.56	8 29 42.7	123.94
5	9 40 46.52	16 54 53.0	86.92	5	11 29 19.48	8 17 17.5	124.45
6	9 43 5.16	16 46 8.4	87.95	6	11 31 32.30	8 4 49.3	124.94
7	9 45 23.68	16 37 17.6	88.97	7	11 33 45.03	7 52 18.2	125.42
8	9 47 42.09	16 28 20.8	89.98	8	11 35 57.67	7 39 44.2	125.89
9	9 50 0.37	16 19 17.9	90.98	9	11 38 10.22	7 27 7.5	126.35
10	9 52 18.52	16 10 9.0	91.97	10	11 40 22.69	7 14 28.0	126.80
11	9 54 36.55	16 0 54.2	92.96	11	11 42 35.07	7 1 45.9	127.23
12	9 56 54.46	15 51 33.5	93.93	12	11 44 47.37	6 49 1.2	127.65
13	9 59 12.24	15 42 7.0	94.89	13	11 46 59.59	6 36 14.1	128.06
14	10 1 29.89	15 32 34.8	95.85	14	11 49 11.74	6 23 24.5	128.46
15	10 3 47.41	15 22 56.8	96.80	15	11 51 23.81	6 10 32.6	128.83
16	10 6 4.81	15 13 13.2	97.73	16	11 53 35.81	5 57 38.5	129.20
17	10 8 22.07	15 3 24.1	98.65	17	11 55 47.75	5 44 42.2	129.55
18	10 10 39.21	14 53 29.4	99.57	18	11 57 59.62	5 31 43.9	129.89
19	10 12 56.21	14 43 29.3	100.47	19	12 0 11.42	5 18 43.5	130.23
20	10 15 13.09	14 33 23.8	101.36	20	12 2 23.16	5 5 41.1	130.56
21	10 17 29.83	14 23 13.0	102.24	21	12 4 34.85	4 52 36.8	130.86
22	10 19 46.44	14 12 56.9	103.12	22	12 6 46.48	4 39 30.8	131.14
23	10 22 2.92	N. 14 2 35.6	103.98	23	12 8 58.07	N. 4 26 23.1	131.42
<b>SATURDAY 30.</b>				<b>MONDAY, AUG. 1.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	10 24 19.27	N. 13 52 9.1	104.83	0	12 11 9.60	N. 4 13 13.7	131.69
1	10 26 35.49	13 41 37.6	105.67				
2	10 28 51.58	13 31 1.1	106.49				
3	10 31 7.54	13 20 19.7	107.30				
4	10 33 23.37	13 9 33.5	108.11				
5	10 35 39.07	12 58 42.4	108.91				
6	10 37 54.64	12 47 46.6	109.69				
7	10 40 10.08	12 36 46.1	110.47				
8	10 42 25.39	12 25 41.0	111.23				
9	10 44 40.58	12 14 31.4	111.98				
10	10 46 55.65	12 3 17.3	112.72				
11	10 49 10.58	11 51 58.8	113.44				
12	10 51 25.39	11 40 36.0	114.15				
13	10 53 40.08	11 29 9.0	114.85				
14	10 55 54.65	11 17 37.8	115.54				
15	10 58 9.09	11 6 2.5	116.22				
16	11 0 23.42	10 54 23.1	116.89				
17	11 2 37.63	10 42 39.8	117.54				
18	11 4 51.72	10 30 52.6	118.18				
19	11 7 5.69	10 19 1.6	118.82				
20	11 9 19.56	10 7 6.8	119.43				
21	11 11 33.31	9 55 8.4	120.03				
22	11 13 46.95	9 43 6.4	120.63				
23	11 16 0.48	9 31 0.8	121.22				
24	11 18 13.90	N. 9 18 51.8	121.78				

## PHASES OF THE MOON.

July 5	) First Quarter	- 16 30.3
12	○ Full Moon	- 10 35.3
20	( Last Quarter	- 2 16.9
27	● New Moon	- 23 18.0

July 8	( Perigee	- - - - 15
20	( Apogee	- - - - 18



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	SUN W.	30 12 35	2899	31 44 55	2889	33 17 28	2880	34 50 12	2871
	Spica E.	72 34 46	2613	70 56 9	2605	69 17 21	2598	67 38 23	2591
2	SUN W.	42 36 48	2827	44 10 41	2818	45 44 46	2809	47 19 2	2801
	Spica E.	59 21 6	2556	57 41 11	2551	56 1 8	2545	54 20 57	2540
	Antares E.	105 15 33	2553	103 35 34	2545	101 55 23	2536	100 15 0	2528
3	SUN W.	55 13 4	2760	56 48 25	2752	58 23 56	2744	59 59 38	2736
	Spica E.	45 58 18	2517	44 17 29	2514	42 36 36	2512	40 55 40	2511
	Antares E.	91 50 17	2489	90 8 48	2482	88 27 9	2474	86 45 20	2467
	Saturn E.	107 28 48	2445	105 45 49	2418	104 2 40	2411	102 19 21	2403
4	SUN W.	68 0 40	2698	69 37 23	2691	71 14 15	2683	72 51 18	2676
	Regulus W.	22 31 6	2423	24 14 8	2412	25 57 25	2402	27 40 57	2392
	Spica E.	32 30 58	2521	30 50 13	2528	29 9 39	2538	27 29 19	2551
	Antares E.	78 13 47	2434	76 31 0	2428	74 48 5	2421	73 5 1	2415
	Saturn E.	93 40 11	2368	91 55 50	2362	90 11 21	2355	88 26 41	2348
5	SUN W.	80 58 56	2641	82 36 56	2634	84 15 5	2627	85 53 24	2621
	Regulus W.	36 21 54	2350	38 6 40	2343	39 51 37	2336	41 36 44	2328
	Antares E.	64 27 39	2389	62 43 48	2384	60 59 51	2380	59 15 48	2376
	Saturn E.	79 40 58	2315	77 55 21	2310	76 9 36	2303	74 23 41	2297
	α Aquilæ E.	109 32 59	3054	108 3 53	3034	106 34 22	3015	105 4 27	2997
6	SUN W.	94 7 7	2589	95 46 17	2583	97 25 35	2577	99 5 1	2572
	Regulus W.	50 24 49	2297	52 10 53	2291	53 57 6	2285	55 43 28	2279
	Antares E.	50 34 15	2362	48 49 45	2360	47 5 13	2360	45 20 41	2360
	Saturn E.	65 31 56	2268	63 45 10	2263	61 58 16	2258	60 11 15	2253
	α Aquilæ E.	97 29 58	2930	95 58 17	2920	94 26 23	2912	92 54 19	2905
7	SUN W.	107 24 1	2546	109 4 10	2542	110 44 24	2538	112 24 45	2534
	Regulus W.	64 37 12	2255	66 24 18	2250	68 11 31	2247	69 58 49	2243
	Antares E.	36 38 26	2376	34 54 16	2384	33 10 18	2394	31 26 34	2407
	Saturn E.	51 14 18	2229	49 26 34	2226	47 38 45	2222	45 50 50	2219
	α Aquilæ E.	85 12 12	2887	83 39 36	2887	82 7 1	2889	80 34 28	2892
8	SUN W.	120 47 43	2518	122 28 31	2516	124 9 22	2514	125 50 16	2512
	Regulus W.	78 56 40	2227	80 44 27	2225	82 32 17	2223	84 20 10	2221
	Spica W.	25 48 17	2404	27 31 46	2382	29 15 47	2363	31 0 16	2346
	Saturn E.	36 50 3	2204	35 1 41	2202	33 13 17	2201	31 24 51	2200
	α Aquilæ E.	72 53 20	2931	71 21 40	2945	69 50 18	2959	68 19 14	2976
	Fomalhaut E.	105 43 49	2442	104 1 14	2437	102 18 32	2432	100 35 43	2428
9	Regulus W.	93 20 1	2219	95 8 0	2219	96 55 59	2220	98 43 56	2221
	Spica W.	39 47 21	2298	41 33 23	2293	43 19 33	2288	45 5 50	2285
	α Aquilæ E.	60 50 20	3102	59 22 13	3136	57 54 47	3175	56 28 8	3218
	Fomalhaut E.	92 0 32	2419	90 17 24	2419	88 34 17	2421	86 51 12	2422
	α Pegasi E.	107 40 14	2649	106 2 25	2641	104 24 26	2635	102 46 19	2631
10	Spica W.	53 57 58	2282	55 44 25	2284	57 30 48	2285	59 17 10	2288
	α Aquilæ E.	49 29 15	3509	48 9 1	3588	46 50 14	3676	45 33 1	3773
	Fomalhaut E.	78 16 49	2444	76 34 17	2452	74 51 56	2459	73 9 45	2468
	α Pegasi E.	94 34 43	2625	92 56 22	2627	91 18 4	2631	89 39 52	2636
11	Spica W.	68 7 39	2311	69 53 23	2316	71 38 59	2323	73 24 25	2330



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	Sun	W.	36 23 8	2862	37 56 15	2852	39 29 35	2844	41 3 6	2835
	Spica	E.	65 59 15	2583	64 19 57	2576	62 40 29	2569	61 0 52	2563
2	Sun	W.	48 53 28	2792	50 28 6	2784	52 2 55	2776	53 37 54	2768
	Spica	E.	52 40 39	2534	51 0 13	2530	49 19 41	2525	47 39 2	2521
	Antares	E.	98 34 25	2520	96 53 40	2512	95 12 43	2504	93 31 36	2496
3	Sun	W.	61 35 30	2729	63 11 32	2721	64 47 44	2713	66 24 7	2705
	Spica	E.	39 14 42	2510	37 33 43	2511	35 52 45	2513	34 11 49	2516
	Antares	E.	85 3 20	2460	83 21 11	2453	81 38 52	2447	79 56 24	2440
	Saturn	E.	100 35 51	2396	98 52 11	2389	97 8 21	2382	95 24 21	2375
4	Sun	W.	74 28 30	2669	76 5 52	2661	77 43 24	2654	79 21 6	2648
	Regulus	W.	29 24 44	2383	31 8 43	2374	32 52 55	2366	34 37 18	2357
	Spica	E.	25 49 16	2569	24 9 39	2592	22 30 33	2623	20 52 10	2665
	Antares	E.	71 21 48	2410	69 38 27	2405	67 54 59	2399	66 11 22	2394
	Saturn	E.	86 41 51	2341	84 56 52	2335	83 11 44	2328	81 26 25	2322
5	Sun	W.	87 31 51	2614	89 10 27	2607	90 49 12	2601	92 28 5	2595
	Regulus	W.	43 22 2	2322	45 7 30	2315	46 53 7	2309	48 38 53	2302
	Antares	E.	57 31 39	2372	55 47 24	2369	54 3 5	2366	52 18 42	2364
	Saturn	E.	72 37 37	2291	70 51 25	2285	69 5 4	2279	67 18 34	2274
	α Aquilæ	E.	103 34 10	2981	102 3 33	2966	100 32 38	2952	99 1 25	2941
6	Sun	W.	100 44 35	2566	102 24 16	2561	104 4 4	2556	105 44 0	2552
	Regulus	W.	57 29 58	2274	59 16 35	2269	61 3 20	2264	62 50 13	2260
	Antares	E.	43 36 8	2361	41 51 37	2363	40 7 8	2366	38 22 44	2370
	Saturn	E.	58 24 6	2247	56 36 49	2243	54 49 26	2238	53 1 55	2234
	α Aquilæ	E.	91 22 6	2899	89 49 45	2894	88 17 18	2890	86 44 46	2888
7	Sun	W.	114 5 11	2530	115 45 42	2527	117 26 18	2524	119 6 58	2520
	Regulus	W.	71 46 13	2239	73 33 43	2235	75 21 18	2233	77 8 57	2230
	Antares	E.	29 43 9	2423	28 0 7	2443	26 17 33	2469	24 35 37	2502
	Saturn	E.	44 2 50	2215	42 14 44	2212	40 26 34	2209	38 38 20	2207
	α Aquilæ	E.	79 1 59	2896	77 29 35	2903	75 57 20	2910	74 25 14	2919
8	Sun	W.	127 31 12	2511	129 12 10	2510	130 53 10	2509	132 34 10	2509
	Regulus	W.	86 8 6	2220	87 56 3	2219	89 44 2	2219	91 32 1	2219
	Spica	W.	32 45 8	2333	34 30 19	2322	36 15 47	2313	38 1 28	2305
	Saturn	E.	29 36 23	2198	27 47 53	2198	25 59 23	2198	24 10 53	2199
	α Aquilæ	E.	66 48 31	2996	65 18 14	3019	63 48 24	3043	62 19 5	3071
	Fomalhaut	E.	98 52 48	2424	97 9 48	2422	95 26 45	2420	93 43 39	2419
9	Regulus	W.	100 31 52	2223	102 19 45	2225	104 7 35	2227	105 55 22	2231
	Spica	W.	46 52 11	2283	48 38 35	2281	50 25 2	2280	52 11 30	2281
	α Aquilæ	E.	55 2 20	3264	53 37 26	3317	52 13 34	3374	50 50 48	3438
	Fomalhaut	E.	85 8 9	2425	83 25 10	2429	81 42 17	2433	79 59 29	2438
	α Pegasi	E.	101 8 6	2627	99 29 48	2625	97 51 2	2624	96 13 5	2624
10	Spica	W.	61 3 27	2291	62 49 39	2295	64 35 46	2300	66 21 46	2305
	α Aquilæ	E.	44 17 31	3882	43 3 53	4003	41 52 17	4139	40 42 53	4292
	Fomalhaut	E.	71 27 47	2478	69 46 2	2489	68 4 33	2500	66 23 20	2513
	α Pegasi	E.	88 1 46	2641	86 23 47	2648	84 45 58	2657	83 8 20	2666
11	Spica	W.	75 9 40	2338	76 54 44	2346	78 39 37	2355	80 24 17	2364



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11	Antares W.	22 58 16	2546	24 38 25	2518	26 19 13	2497	28 0 30	2482
	Fomalhaut E.	64 42 25	2527	63 1 50	2543	61 21 36	2559	59 41 45	2577
	α Pegasi E.	81 30 54	2676	79 53 42	2688	78 16 46	2701	76 40 7	2715
12	Spica W.	82 8 44	2373	83 52 57	2384	85 36 55	2394	87 20 39	2405
	Antares W.	36 30 38	2455	38 12 54	2457	39 55 8	2459	41 37 18	2463
	Saturn W.	20 43 29	2324	22 28 54	2333	24 14 5	2343	25 59 2	2354
	Fomalhaut E.	51 29 23	2692	49 52 33	2721	48 16 21	2753	46 40 51	2787
	α Pegasi E.	68 42 5	2805	67 7 44	2827	65 33 51	2852	64 0 30	2877
13	Antares W.	50 6 10	2500	51 47 23	2509	53 28 23	2519	55 9 10	2530
	Saturn W.	34 39 47	2412	36 23 5	2424	38 6 5	2437	39 48 47	2450
	Fomalhaut E.	38 55 56	3014	37 26 1	3075	35 57 20	3142	34 30 1	3217
	α Pegasi E.	56 22 48	3036	54 53 20	3075	53 24 40	3117	51 56 51	3162
	α Arietis E.	97 52 58	2582	96 13 38	2593	94 34 34	2606	92 55 47	2619
14	Antares W.	63 29 7	2590	65 8 15	2602	66 47 7	2616	68 25 40	2629
	Saturn W.	48 17 32	2519	49 58 19	2534	51 38 45	2548	53 18 52	2562
	α Pegasi E.	44 52 38	3447	43 31 15	3519	42 11 12	3599	40 52 37	3686
	α Arietis E.	84 46 26	2690	83 9 33	2705	81 33 0	2721	79 56 48	2738
	Aldebaran E.	116 5 59	2540	114 25 42	2555	112 45 45	2569	111 6 8	2583
15	Antares W.	76 33 47	2699	78 10 28	2713	79 46 50	2728	81 22 53	2742
	Saturn W.	61 34 24	2636	63 12 30	2651	64 50 16	2666	66 27 42	2680
	α Arietis E.	72 1 19	2824	70 27 22	2842	68 53 48	2860	67 20 38	2880
	Aldebaran E.	102 53 1	2657	101 15 23	2672	99 38 6	2687	98 1 8	2702
	Jupiter E.	110 27 16	2728	108 51 13	2744	107 15 31	2758	105 40 8	2773
	Venus E.	111 52 51	3064	110 23 57	3081	108 55 24	3096	107 27 10	3113
16	Saturn W.	74 30 0	2752	76 5 31	2766	77 40 43	2780	79 15 37	2794
	α Aquilæ W.	49 3 23	4010	50 14 53	3967	51 27 5	3930	52 39 55	3897
	α Arietis E.	59 41 1	2980	58 10 23	3001	56 40 11	3023	55 10 27	3045
	Aldebaran E.	90 1 12	2774	88 26 10	2788	86 51 27	2802	85 17 1	2815
	Jupiter E.	97 48 4	2846	96 14 36	2860	94 41 26	2874	93 8 34	2888
	Venus E.	100 10 55	3193	98 44 37	3209	97 18 38	3224	95 52 57	3238
	Mars E.	106 54 44	3015	105 24 50	3030	103 55 14	3044	102 25 56	3058
	Sun E.	135 58 16	3109	134 30 18	3124	133 2 38	3140	131 35 16	3155
17	Saturn W.	87 5 44	2859	88 38 56	2871	90 11 52	2883	91 44 33	2894
	α Aquilæ W.	58 51 17	3780	60 6 40	3765	61 22 19	3752	62 38 11	3739
	α Arietis E.	47 48 52	3168	46 22 5	3195	44 55 50	3224	43 30 10	3254
	Aldebaran E.	77 29 14	2880	75 56 30	2893	74 24 2	2905	72 51 49	2916
	Jupiter E.	85 28 35	2954	83 57 24	2966	82 26 29	2978	80 55 49	2989
	Venus E.	88 48 52	3310	87 24 52	3324	86 1 9	3337	84 37 40	3350
	Mars E.	95 3 44	3127	93 36 7	3139	92 8 45	3152	90 41 38	3164
	Sun E.	124 22 49	3225	122 57 9	3238	121 31 45	3251	120 6 36	3264
18	α Aquilæ W.	69 0 11	3701	70 16 57	3696	71 33 48	3693	72 50 42	3690
	Fomalhaut W.	33 33 33	3696	34 50 24	3652	36 8 2	3614	37 26 21	3581
	Aldebaran E.	65 14 17	2970	63 43 26	2978	62 12 46	2988	60 42 18	2997
	Jupiter E.	73 26 0	3043	71 56 41	3053	70 27 34	3062	68 58 38	3070
	Venus E.	77 43 51	3408	76 21 44	3418	74 59 48	3429	73 38 5	3439
	Mars E.	83 29 35	3219	82 3 48	3230	80 38 14	3239	79 12 51	3248



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11	Antares W.	29 42 9	2471	31 24 4	2463	33 6 10	2458	34 48 22	2455
	Fomalhaut E.	58 2 19	2596	56 23 19	2618	54 44 49	2641	53 6 49	2666
	α Pegasi E.	75 3 47	2730	73 27 47	2746	71 52 8	2765	70 16 54	2784
12	Spica W.	89 4 7	2416	90 47 19	2427	92 30 15	2439	94 12 54	2452
	Antares W.	43 19 23	2469	45 1 19	2475	46 43 7	2483	48 24 44	2491
	Saturn W.	27 43 43	2364	29 28 9	2375	31 12 19	2388	32 56 11	2399
	Fomalhaut E.	45 6 6	2824	43 32 10	2865	41 59 6	2910	40 27 0	2959
	α Pegasi E.	62 27 42	2905	60 55 30	2935	59 23 55	2967	57 53 0	3001
13	Antares W.	56 49 41	2541	58 29 57	2553	60 9 57	2565	61 49 40	2577
	Saturn W.	41 31 10	2463	43 13 15	2477	44 55 0	2491	46 36 26	2505
	Fomalhaut E.	33 4 12	3303	31 40 4	3400	30 17 47	3510	28 57 34	3637
	α Pegasi E.	50 29 57	3210	49 4 0	3263	47 39 6	3319	46 15 17	3380
	α Arietis E.	91 17 18	2632	89 39 6	2646	88 1 14	2660	86 23 40	2675
	Aldebaran E.	109 26 50	2599	107 47 53	2613	106 9 15	2628	104 30 58	2643
15	Antares W.	82 58 37	2757	84 34 1	2771	86 9 7	2785	87 43 54	2800
	Saturn W.	68 4 49	2695	69 41 36	2710	71 18 3	2724	72 54 11	2738
	α Arietis E.	65 47 53	2898	64 15 32	2918	62 43 36	2938	61 12 6	2958
	Aldebaran E.	96 24 30	2716	94 48 12	2731	93 12 13	2745	91 36 33	2759
	Jupiter E.	104 5 5	2788	102 30 21	2802	100 55 56	2818	99 21 51	2832
	Venus E.	105 59 16	3129	104 31 42	3145	103 4 27	3162	101 37 32	3177
	Saturn W.	80 50 13	2808	82 24 31	2821	83 58 32	2833	85 32 17	2847
16	α Aquilæ W.	53 53 18	3868	55 7 11	3842	56 21 30	3819	57 36 13	3798
	α Arietis E.	53 41 10	3068	52 12 21	3092	50 44 1	3116	49 16 11	3142
	Aldebaran E.	83 42 53	2829	82 9 3	2842	80 35 30	2855	79 2 14	2868
	Jupiter E.	91 36 0	2902	90 3 44	2915	88 31 44	2928	87 0 1	2942
	Venus E.	94 27 33	3254	93 2 27	3269	91 37 39	3282	90 13 7	3297
	Mars E.	100 56 55	3073	99 28 12	3087	97 59 46	3101	96 31 37	3114
	Sun E.	130 8 13	3168	128 41 26	3183	127 14 57	3198	125 48 45	3211
	Saturn W.	93 16 59	2905	94 49 11	2916	96 21 9	2927	97 52 54	2937
17	α Aquilæ W.	63 54 17	3729	65 10 33	3721	66 26 58	3713	67 43 31	3707
	α Arietis E.	42 5 5	3287	40 40 38	3321	39 16 51	3357	37 53 46	3396
	Aldebaran E.	71 19 51	2927	69 48 7	2938	68 16 37	2949	66 45 20	2960
	Jupiter E.	79 25 23	3001	77 55 12	3013	76 25 15	3023	74 55 31	3034
	Venus E.	83 14 27	3362	81 51 27	3375	80 28 42	3386	79 6 10	3398
	Mars E.	89 14 46	3176	87 48 8	3188	86 21 44	3199	84 55 33	3209
	Sun E.	118 41 42	3276	117 17 2	3288	115 52 36	3299	114 28 23	3310
	α Aquilæ W.	74 7 40	3688	75 24 40	3687	76 41 41	3685	77 58 44	3685
	Fomalhaut W.	38 45 16	3551	40 4 44	3526	41 24 39	3504	42 44 59	3483
18	Aldebaran E.	59 12 1	3005	57 41 54	3013	56 11 57	3020	54 42 9	3027
	Jupiter E.	67 29 52	3079	66 1 17	3087	64 32 52	3095	63 4 36	3102
	Venus E.	72 16 32	3447	70 55 9	3456	69 33 56	3464	68 12 52	3472
	Mars E.	77 47 38	3257	76 22 36	3265	74 57 43	3272	73 32 59	3280



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18	SUN E.	113 4 23	3331	111 40 36	3331	110 17 0	3341	108 53 36	3350
19	$\alpha$ Aquilæ W.	79 15 47	3684	80 32 51	3685	81 49 54	3686	83 6 56	3687
	Fomalhaut W.	44 5 42	3465	45 26 45	3450	46 48 5	3436	48 9 41	3422
	$\alpha$ Pegasi W.	33 22 0	4695	34 23 4	4577	35 25 49	4471	36 30 7	4377
	Aldebaran E.	53 12 30	3034	51 42 59	3039	50 13 35	3046	48 44 19	3051
	Jupiter E.	61 36 29	3108	60 8 29	3114	58 40 37	3119	57 12 51	3125
	Venus E.	66 51 57	3479	65 31 10	3486	64 10 30	3492	62 49 57	3498
	Mars E.	72 8 24	3287	70 43 57	3293	69 19 37	3299	67 55 24	3304
	SUN E.	101 59 4	3389	100 36 35	3396	99 14 14	3403	97 52 1	3408
20	Fomalhaut W.	55 1 0	3372	56 23 49	3364	57 46 47	3356	59 9 54	3348
	$\alpha$ Pegasi W.	42 10 17	4036	43 21 21	3986	44 33 14	3940	45 45 53	3898
	Aldebaran E.	41 19 22	3070	39 50 36	3073	38 21 53	3075	36 53 13	3076
	Jupiter E.	49 55 28	3144	48 28 12	3147	47 0 59	3148	45 38 48	3150
	Venus E.	56 8 35	3517	54 48 30	3521	53 28 29	3523	52 8 30	3524
	Mars E.	60 55 38	3323	59 31 53	3326	58 8 11	3327	56 44 31	3329
	SUN E.	91 2 12	3428	89 40 27	3430	88 18 44	3431	86 57 3	3433
21	Fomalhaut W.	66 7 36	3313	67 31 33	3306	68 55 38	3299	70 19 51	3292
	$\alpha$ Pegasi W.	51 58 47	3732	53 15 1	3705	54 31 43	3680	55 48 52	3655
	Jupiter E.	38 18 9	3150	36 51 0	3150	35 23 51	3148	33 56 39	3146
	Venus E.	45 28 44	3523	44 8 45	3520	42 48 43	3519	41 28 40	3516
	Mars E.	49 46 22	3328	48 22 43	3326	46 59 1	3324	45 35 17	3321
	SUN E.	80 8 50	3432	78 47 10	3430	77 25 27	3427	76 3 41	3425
22	Fomalhaut W.	77 22 58	3256	78 48 1	3248	80 13 13	3240	81 38 35	3233
	$\alpha$ Pegasi W.	62 20 40	3551	63 40 8	3534	64 59 55	3516	66 20 2	3498
	Venus E.	34 47 23	3494	33 26 52	3488	32 6 14	3482	30 45 30	3475
	Mars E.	38 35 42	3302	37 11 33	3296	35 47 17	3291	34 22 55	3284
	SUN E.	69 13 56	3403	67 51 43	3397	66 29 23	3392	65 6 57	3385
23	Fomalhaut W.	88 47 40	3192	90 13 59	3184	91 40 27	3175	93 7 6	3167
	$\alpha$ Pegasi W.	73 5 15	3419	74 27 10	3404	75 49 22	3389	77 11 51	3376
	$\alpha$ Arietis W.	29 41 52	3649	30 59 33	3585	32 18 23	3527	33 38 17	3475
	SUN E.	58 12 41	3345	56 49 21	3336	55 25 51	3326	54 2 10	3317
24	$\alpha$ Pegasi W.	84 8 9	3308	85 32 11	3296	86 56 27	3284	88 20 57	3272
	$\alpha$ Arietis W.	40 30 46	3275	41 55 27	3243	43 20 45	3212	44 46 40	3184
	SUN E.	47 0 48	3263	45 35 53	3252	44 10 45	3239	42 45 22	3228
25	$\alpha$ Arietis W.	52 4 12	3060	53 33 10	3038	55 2 35	3017	56 32 27	2997
	Aldebaran W.	19 2 49	2840	20 36 25	2825	22 10 20	2811	23 44 34	2796
	SUN E.	35 34 51	3165	34 8 0	3152	32 40 53	3138	31 13 30	3125
30	SUN W.	25 57 16	2690	27 34 9	2683	29 11 12	2675	30 48 25	2668
	Spica E.	49 33 6	2437	47 50 24	2435	46 7 39	2432	44 24 49	2430
	Antares E.	95 26 16	2418	93 43 7	2410	91 59 47	2404	90 16 18	2397
	Saturn E.	109 35 42	2363	107 51 14	2356	106 6 36	2350	104 21 49	2344
31	SUN W.	38 56 47	2637	40 34 52	2632	42 13 3	2627	43 51 21	2623
	Spica E.	35 50 31	2437	34 7 49	2422	32 25 14	2450	30 42 51	2460
	Antares E.	81 36 46	2372	79 52 31	2367	78 8 9	2364	76 23 42	2360
	Saturn E.	95 35 46	2317	93 50 11	2312	92 4 29	2308	90 18 41	2304



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18	SUN E.	107 30 22 3359		106 7 18 3368		104 44 25 3375		103 21 40 3383	
19	$\alpha$ Aquilæ W.	84 23 57 3688		85 40 57 3689		86 57 56 3692		88 14 52 3694	
	Fomalhaut W.	49 31 32 3410		50 53 37 3400		52 15 54 3390		53 38 22 3381	
	$\alpha$ Pegasi W.	37 35 49 4294		38 42 47 4219		39 50 55 4152		41 0 7 4091	
	Aldebaran E.	47 15 9 3056		45 46 5 3060		44 17 6 3064		42 48 12 3067	
	Jupiter E.	55 45 12 3130		54 17 39 3134		52 50 11 3138		51 22 47 3142	
	Venus E.	61 29 31 3503		60 9 10 3507		58 48 54 3511		57 28 42 3515	
	Mars E.	66 31 17 3308		65 7 15 3313		63 43 18 3317		62 19 26 3320	
	SUN E.	96 29 53 3413		95 7 51 3417		93 45 54 3421		92 24 1 3424	
20	Fomalhaut W.	60 33 10 3340		61 56 35 3334		63 20 7 3326		64 43 48 3320	
	$\alpha$ Pegasi W.	46 59 15 3860		48 13 15 3824		49 27 53 3791		50 43 4 3761	
	Aldebaran E.	35 24 34 3078		33 55 57 3079		32 27 22 3079		30 58 46 3079	
	Jupiter E.	44 6 39 3151		42 39 31 3151		41 12 23 3152		39 45 16 3152	
	Venus E.	50 48 32 3524		49 28 35 3524		48 8 38 3524		46 48 41 3524	
	Mars E.	55 20 53 3329		53 57 15 3330		52 33 38 3330		51 10 1 3328	
	SUN E.	85 35 24 3434		84 13 46 3434		82 52 8 3433		81 30 29 3433	
21	Fomalhaut W.	71 44 12 3285		73 8 41 3278		74 33 18 3271		75 58 4 3264	
	$\alpha$ Pegasi W.	57 6 27 3632		58 24 26 3611		59 42 48 3590		61 1 33 3570	
	Jupiter E.	32 29 25 3143		31 2 8 3141		29 34 48 3138		28 7 24 3134	
	Venus E.	40 8 33 3512		38 48 22 3509		37 28 8 3504		36 7 48 3499	
	Mars E.	44 11 30 3319		42 47 40 3315		41 23 46 3311		39 59 47 3306	
	SUN E.	74 41 53 3422		73 20 1 3417		71 58 4 3414		70 36 3 3409	
22	Fomalhaut W.	83 4 5 3225		84 29 44 3217		85 55 33 3209		87 21 32 3201	
	$\alpha$ Pegasi W.	67 40 29 3482		69 1 13 3465		70 22 16 3449		71 43 37 3434	
	Venus E.	29 24 38 3468		28 3 38 3461		26 42 30 3453		25 21 13 3444	
	Mars E.	32 58 25 3279		31 33 49 3272		30 9 4 3265		28 44 12 3258	
	SUN E.	63 44 23 3377		62 21 40 3370		60 58 49 3363		59 35 50 3354	
23	Fomalhaut W.	94 33 54 3158		96 0 53 3149		97 28 3 3142		98 55 22 3133	
	$\alpha$ Pegasi W.	78 34 35 3361		79 57 36 3348		81 20 52 3335		82 44 23 3322	
	$\alpha$ Arietis W.	34 59 9 3429		36 20 53 3386		37 43 26 3345		39 6 45 3309	
	SUN E.	52 38 18 3307		51 14 14 3296		49 49 58 3286		48 25 30 3274	
24	$\alpha$ Pegasi W.	89 45 41 3260		91 10 39 3249		92 35 50 3238		94 1 14 3228	
	$\alpha$ Arietis W.	46 13 8 3157		47 40 8 3131		49 7 40 3107		50 35 41 3083	
	SUN E.	41 19 46 3215		39 53 54 3203		38 27 48 3191		37 1 28 3177	
25	$\alpha$ Arietis W.	58 2 44 2977		59 33 26 2957		61 4 32 2938		62 36 2 2920	
	Aldebaran W.	25 19 7 2782		26 53 59 2767		28 29 10 2753		30 4 39 2740	
	SUN E.	29 45 51 3112		28 17 56 3100		26 49 46 3086		25 21 19 3073	
30	SUN W.	32 25 48 2661		34 3 20 2655		35 41 1 2649		37 18 50 2643	
	Spica E.	42 41 57 2429		40 59 4 2429		39 16 10 2431		37 33 19 2433	
	Antares E.	88 32 39 2392		86 48 53 2386		85 4 58 2381		83 20 56 2376	
	Saturn E.	102 36 53 2337		100 51 48 2332		99 6 35 2326		97 21 14 2322	
31	SUN W.	45 29 45 2618		47 8 15 2615		48 46 50 2611		50 25 30 2607	
	Spica E.	29 0 42 2474		27 18 52 2491		25 37 26 2513		23 56 30 2540	
	Antares E.	74 39 10 2357		72 54 33 2354		71 9 52 2352		69 25 9 2350	
	Saturn E.	88 32 47 2300		86 46 47 2297		85 0 43 2293		83 14 33 2290	



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1°45045	0°68640	0°14086	1°45581	101°461	<sup>h</sup> 17 <sup>m</sup> 19 <sup>s</sup> 48°30
2	1°45515	0°69181	0°14193	1°45559	100°952	17 15 52°39
3	1°45979	0°69764	0°14299	1°45536	100°438	17 11 56°47
4	1°46436	0°70390	0°14406	1°45512	99°919	17 8 0°56
5	1°46887	0°71054	0°14512	1°45487	99°395	17 4 4°65
6	1°47331	0°71752	0°14616	1°45462	98°868	17 0 8°74
7	1°47769	0°72483	0°14721	1°45436	98°336	16 56 12°83
8	1°48201	0°73245	0°14824	1°45409	97°800	16 52 16°92
9	1°48626	0°74038	0°14927	1°45380	97°262	16 48 21°00
10	1°49044	0°74860	0°15029	1°45351	96°721	16 44 25°09
11	1°49456	0°75708	0°15130	1°45321	96°175	16 40 29°18
12	1°49863	0°76577	0°15231	1°45291	95°625	16 36 33°27
13	1°50263	0°77467	0°15331	1°45260	95°073	16 32 37°36
14	1°50657	0°78378	0°15429	1°45228	94°517	16 28 41°45
15	1°51045	0°79309	0°15528	1°45195	93°958	16 24 45°54
16	1°51426	0°80257	0°15625	1°45162	93°398	16 20 49°63
17	1°51802	0°81218	0°15721	1°45128	92°834	16 16 53°72
18	1°52171	0°82190	0°15817	1°45093	92°267	16 12 57°80
19	1°52535	0°83174	0°15912	1°45058	91°698	16 9 1°89
20	1°52893	0°84169	0°16006	1°45022	91°126	16 5 5°98
21	1°53244	0°85173	0°16099	1°44986	90°552	16 1 10°07
22	1°53590	0°86184	0°16192	1°44950	89°975	15 57 14°16
23	1°53930	0°87201	0°16283	1°44913	89°396	15 53 18°25
24	1°54264	0°88223	0°16373	1°44875	88°817	15 49 22°34
25	1°54592	0°89249	0°16463	1°44836	88°236	15 45 26°43
26	1°54914	0°90278	0°16551	1°44797	87°653	15 41 30°52
27	1°55230	0°91308	0°16638	1°44758	87°070	15 37 34°61
28	1°55541	0°92337	0°16724	1°44718	86°485	15 33 38°70
29	1°55846	0°93366	0°16810	1°44678	85°898	15 29 42°79
30	1°56145	0°94395	0°16895	1°44638	85°310	15 25 46°88
31	1°56438	0°95423	0°16979	1°44598	84°721	15 21 50°97
32	1°56726	0°96449	0°17062	1°44557	84°130	15 17 55°06



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .785249. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	+0 <sup>h</sup> .5069	-1 <sup>h</sup> .3041	+9 <sup>h</sup> .2627	+0 <sup>h</sup> .5519	2404245	100	181	.4956
2	0 <sup>h</sup> .5466	1 <sup>h</sup> .3028	9 <sup>h</sup> .2708	0 <sup>h</sup> .5501	2404246	101	182	.4983
3	0 <sup>h</sup> .5828	1 <sup>h</sup> .3014	9 <sup>h</sup> .2786	0 <sup>h</sup> .5483	2404247	102	183	.5010
4	+0 <sup>h</sup> .6161	-1 <sup>h</sup> .2998	+9 <sup>h</sup> .2864	+0 <sup>h</sup> .5463	2404248	103	184	.5038
5	0 <sup>h</sup> .6469	1 <sup>h</sup> .2981	9 <sup>h</sup> .2939	0 <sup>h</sup> .5443	2404249	104	185	.5065
6	0 <sup>h</sup> .6756	1 <sup>h</sup> .2963	9 <sup>h</sup> .3013	0 <sup>h</sup> .5422	2404250	105	186	.5093
7	+0 <sup>h</sup> .7024	-1 <sup>h</sup> .2943	+9 <sup>h</sup> .3085	+0 <sup>h</sup> .5400	2404251	106	187	.5120
8	0 <sup>h</sup> .7275	1 <sup>h</sup> .2922	9 <sup>h</sup> .3156	0 <sup>h</sup> .5378	2404252	107	188	.5147
9	0 <sup>h</sup> .7511	1 <sup>h</sup> .2900	9 <sup>h</sup> .3226	0 <sup>h</sup> .5355	2404253	108	189	.5175
10	+0 <sup>h</sup> .7734	-1 <sup>h</sup> .2877	+9 <sup>h</sup> .3294	+0 <sup>h</sup> .5331	2404254	109	190	.5202
11	0 <sup>h</sup> .7945	1 <sup>h</sup> .2852	9 <sup>h</sup> .3360	0 <sup>h</sup> .5306	2404255	110	191	.5229
12	0 <sup>h</sup> .8145	1 <sup>h</sup> .2826	9 <sup>h</sup> .3425	0 <sup>h</sup> .5280	2404256	111	192	.5257
13	+0 <sup>h</sup> .8335	-1 <sup>h</sup> .2799	+9 <sup>h</sup> .3490	+0 <sup>h</sup> .5254	2404257	112	193	.5284
14	0 <sup>h</sup> .8515	1 <sup>h</sup> .2770	9 <sup>h</sup> .3552	0 <sup>h</sup> .5227	2404258	113	194	.5312
15	0 <sup>h</sup> .8688	1 <sup>h</sup> .2739	9 <sup>h</sup> .3614	0 <sup>h</sup> .5199	2404259	114	195	.5339
16	+0 <sup>h</sup> .8853	-1 <sup>h</sup> .2708	+9 <sup>h</sup> .3674	+0 <sup>h</sup> .5171	2404260	115	196	.5366
17	0 <sup>h</sup> .9010	1 <sup>h</sup> .2674	9 <sup>h</sup> .3733	0 <sup>h</sup> .5142	2404261	116	197	.5394
18	0 <sup>h</sup> .9161	1 <sup>h</sup> .2640	9 <sup>h</sup> .3791	0 <sup>h</sup> .5112	2404262	117	198	.5421
19	+0 <sup>h</sup> .9306	-1 <sup>h</sup> .2604	+9 <sup>h</sup> .3847	+0 <sup>h</sup> .5081	2404263	118	199	.5448
20	0 <sup>h</sup> .9445	1 <sup>h</sup> .2566	9 <sup>h</sup> .3903	0 <sup>h</sup> .5050	2404264	119	200	.5476
21	0 <sup>h</sup> .9579	1 <sup>h</sup> .2527	9 <sup>h</sup> .3957	0 <sup>h</sup> .5017	2404265	120	201	.5503
22	+0 <sup>h</sup> .9707	-1 <sup>h</sup> .2486	+9 <sup>h</sup> .4011	+0 <sup>h</sup> .4985	2404266	121	202	.5531
23	0 <sup>h</sup> .9831	1 <sup>h</sup> .2443	9 <sup>h</sup> .4063	0 <sup>h</sup> .4951	2404267	122	203	.5558
24	0 <sup>h</sup> .9950	1 <sup>h</sup> .2399	9 <sup>h</sup> .4115	0 <sup>h</sup> .4917	2404268	123	204	.5585
25	+1 <sup>h</sup> .0064	-1 <sup>h</sup> .2354	+9 <sup>h</sup> .4165	+0 <sup>h</sup> .4882	2404269	124	205	.5613
26	1 <sup>h</sup> .0175	1 <sup>h</sup> .2306	9 <sup>h</sup> .4214	0 <sup>h</sup> .4847	2404270	125	206	.5640
27	1 <sup>h</sup> .0282	1 <sup>h</sup> .2257	9 <sup>h</sup> .4263	0 <sup>h</sup> .4811	2404271	126	207	.5667
28	+1 <sup>h</sup> .0385	-1 <sup>h</sup> .2206	+9 <sup>h</sup> .4310	+0 <sup>h</sup> .4774	2404272	127	208	.5695
29	1 <sup>h</sup> .0484	1 <sup>h</sup> .2153	9 <sup>h</sup> .4356	0 <sup>h</sup> .4736	2404273	128	209	.5722
30	1 <sup>h</sup> .0580	1 <sup>h</sup> .2098	9 <sup>h</sup> .4402	0 <sup>h</sup> .4699	2404274	129	210	.5750
31	1 <sup>h</sup> .0673	1 <sup>h</sup> .2041	9 <sup>h</sup> .4447	0 <sup>h</sup> .4660	2404275	130	211	.5777
32	+1 <sup>h</sup> .0763	-1 <sup>h</sup> .1983	+9 <sup>h</sup> .4490	+0 <sup>h</sup> .4621	2404276	131	212	.5804

\* Add .0026 if Fraction be required for the time *t*, see page 329.

\* Add .0026 if Fraction be required for the time  $t$ , see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be added to sub. from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Mon.	1	<sup>h</sup> 8 <sup>m</sup> 45 <sup>s</sup> 39'47	9'713	N. 18° 1' 28" 1	37'81	<sup>m</sup> 6' 64	<sup>m</sup> 6' 4' 33	0'144
Tues.	2	8 49 32'27	9'687	17 46 11'9	38'54	6' 55	6 0' 58	0'169
Wed.	3	8 53 24'44	9'661	17 30 38'4	39'25	6' 46	5 56' 20	0'195
Thur.	4	8 57 15'98	9'635	17 14 47'8	39'96	6' 37	5 51' 21	0'221
Frid.	5	9 1 6'90	9'609	16 58 40'4	40'65	6' 29	5 45' 59	0'247
Sat.	6	9 4 57'21	9'583	16 42 16'6	41'33	6' 20	5 39' 35	0'272
Sun.	7	9 8 46'90	9'558	16 25 36'7	41'99	6' 12	5 32' 51	0'297
Mon.	8	9 12 36'00	9'533	16 8 41'0	42'64	6' 03	5 25' 07	0'322
Tues.	9	9 16 24'49	9'508	15 51 29'8	43'29	5' 95	5 17' 03	0'347
Wed.	10	9 20 12'40	9'484	15 34 3'3	43'91	5' 87	5 8' 41	0'371
Thur.	11	9 23 59'73	9'460	15 16 22'0	44'53	5' 79	4 59' 21	0'395
Frid.	12	9 27 46'49	9'437	14 58 26'0	45'13	5' 70	4 49' 44	0'419
Sat.	13	9 31 32'69	9'414	14 40 15'7	45'72	5' 62	4 39' 12	0'441
Sun.	14	9 35 18'36	9'392	14 21 51'3	46'30	5' 54	4 28' 27	0'463
Mon.	15	9 39 3'49	9'370	14 3 13'1	46'87	5' 46	4 16' 88	0'485
Tues.	16	9 42 48'11	9'349	13 44 21'5	47'42	5' 38	4 4' 97	0'507
Wed.	17	9 46 32'23	9'328	13 25 16'8	47'97	5' 31	3 52' 56	0'527
Thur.	18	9 50 15'85	9'308	13 5 59'1	48'50	5' 24	3 39' 67	0'547
Frid.	19	9 53 58'99	9'288	12 46 28'9	49'01	5' 17	3 26' 30	0'567
Sat.	20	9 57 41'67	9'269	12 26 46'5	49'52	5' 10	3 12' 46	0'586
Sun.	21	10 1 23'89	9'250	12 6 52'1	50'01	5' 03	2 58' 16	0'605
Mon.	22	10 5 5'66	9'231	11 46 46'2	50'48	4' 96	2 43' 42	0'623
Tues.	23	10 8 47'00	9'214	11 26 29'0	50'95	4' 89	2 28' 24	0'641
Wed.	24	10 12 27'92	9'196	11 6 0'8	51'40	4' 83	2 12' 65	0'658
Thur.	25	10 16 8'42	9'179	10 45 22'0	51'83	4' 77	1 56' 65	0'675
Frid.	26	10 19 48'52	9'162	10 24 32'9	52'25	4' 71	1 40' 23	0'692
Sat.	27	10 23 28'22	9'146	10 3 33'9	52'66	4' 65	1 23' 41	0'709
Sun.	28	10 27 7'53	9'130	9 42 25'3	53'05	4' 59	1 6' 22	0'724
Mon.	29	10 30 46'47	9'115	9 21 7'4	53'43	4' 54	0 48' 66	0'739
Tues.	30	10 34 25'06	9'101	8 59 40'5	53'80	4' 49	0 30' 75	0'754
Wed.	31	10 38 3'30	9'087	8 38 5'1	54'15	4' 45	0 12' 49	0'768
Thur.	32	10 41 41'22	9'073	N. 8 16 21'3	54'49	4' 40	0 6' 10	0'781

\* Mean Time of the Semidiameter passing may be found by subtracting 0' 18 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be subt. from added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
Mon.	1	<sup>h</sup> 8 <sup>m</sup> 45 <sup>s</sup> 38.49	N. 18° 1' 31".9	15' 47".9	<sup>m</sup> 6 <sup>s</sup> 4.35	<sup>h</sup> 8 <sup>m</sup> 39 <sup>s</sup> 34.14
Tues.	2	8 49 31.30	17 46 15.8	15 48.0	6 0.60	8 43 30.70
Wed.	3	8 53 23.48	17 30 42.3	15 48.2	5 56.22	8 47 27.26
Thur.	4	8 57 15.04	17 14 51.7	15 48.3	5 51.23	8 51 23.81
Frid.	5	9 1 5.98	16 58 44.3	15 48.5	5 45.61	8 55 20.37
Sat.	6	9 4 56.30	16 42 20.5	15 48.6	5 39.38	8 59 16.93
Sun.	7	9 8 46.02	16 25 40.6	15 48.8	5 32.54	9 3 13.48
Mon.	8	9 12 35.14	16 8 44.8	15 48.9	5 25.10	9 7 10.04
Tues.	9	9 16 23.65	15 51 33.6	15 49.1	5 17.06	9 11 6.59
Wed.	10	9 20 11.58	15 34 7.1	15 49.2	5 8.44	9 15 3.14
Thur.	11	9 23 58.94	15 16 25.7	15 49.4	4 59.24	9 18 59.70
Frid.	12	9 27 45.73	14 58 29.6	15 49.5	4 49.47	9 22 56.26
Sat.	13	9 31 31.96	14 40 19.2	15 49.7	4 39.15	9 26 52.81
Sun.	14	9 35 17.66	14 21 54.7	15 49.9	4 28.30	9 30 49.36
Mon.	15	9 39 2.82	14 3 16.5	15 50.1	4 16.91	9 34 45.91
Tues.	16	9 42 47.47	13 44 24.8	15 50.3	4 5.00	9 38 42.47
Wed.	17	9 46 31.62	13 25 19.9	15 50.4	3 52.59	9 42 39.03
Thur.	18	9 50 15.28	13 6 2.1	15 50.6	3 39.70	9 46 35.58
Frid.	19	9 53 58.46	12 46 31.7	15 50.8	3 26.33	9 50 32.13
Sat.	20	9 57 41.17	12 26 49.1	15 51.0	3 12.49	9 54 28.68
Sun.	21	10 1 23.43	12 6 54.6	15 51.2	2 58.19	9 58 25.24
Mon.	22	10 5 5.24	11 46 48.5	15 51.4	2 43.45	10 2 21.79
Tues.	23	10 8 46.62	11 26 31.1	15 51.6	2 28.27	10 6 18.35
Wed.	24	10 12 27.58	11 6 2.7	15 51.8	2 12.68	10 10 14.90
Thur.	25	10 16 8.12	10 45 23.7	15 52.0	1 56.67	10 14 11.45
Frid.	26	10 19 48.26	10 24 34.4	15 52.2	1 40.25	10 18 8.01
Sat.	27	10 23 28.00	10 3 35.2	15 52.4	1 23.43	10 22 4.57
Sun.	28	10 27 7.36	9 42 26.3	15 52.6	1 6.24	10 26 1.12
Mon.	29	10 30 46.35	9 21 8.1	15 52.9	0 48.67	10 29 57.68
Tues.	30	10 34 24.98	8 59 41.0	15 53.1	0 30.75	10 33 54.23
Wed.	31	10 38 3.27	8 38 5.3	15 53.3	0 12.49	10 37 50.78
Thur.	32	10 41 41.23	N. 8 16 21.3	15 53.6	0 6.10	10 41 47.33

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	128° 58' 30.6	N. 0° 40'	0.0063354	16' 8".1	16' 9".6	59' 7".0	59' 12".4
2	129 55 57.6	0.43	0.0062738	16 10.6	16 11.3	59 16.2	59 18.5
3	130 53 25.3	0.41	0.0062101	16 11.5	16 11.4	59 19.4	59 19.0
4	131 50 53.7	0.38	0.0061445	16 11.0	16 10.2	59 17.4	59 14.6
5	132 48 22.9	0.31	0.0060771	16 9.1	16 7.7	59 10.5	59 5.3
6	133 45 52.8	0.20	0.0060081	16 5.9	16 3.8	58 58.8	58 51.1
7	134 43 23.6	N. 0° 09'	0.0059376	16 1.3	15 58.5	58 42.1	58 31.9
8	135 40 55.2	S. 0° 04'	0.0058658	15 55.4	15 52.0	58 20.5	58 7.8
9	136 38 27.7	0.17	0.0057929	15 48.2	15 44.1	57 53.9	57 39.0
10	137 36 1.2	0.30	0.0057189	15 39.8	15 35.3	57 23.2	57 6.6
11	138 33 35.8	0.41	0.0056438	15 30.6	15 25.8	56 49.4	56 31.9
12	139 31 11.6	0.51	0.0055677	15 21.0	15 16.3	56 14.3	55 57.0
13	140 28 48.7	0.58	0.0054905	15 11.7	15 7.3	55 40.1	55 24.0
14	141 26 27.1	0.63	0.0054122	15 3.2	14 59.4	55 9.0	54 55.2
15	142 24 6.9	0.64	0.0053327	14 56.1	14 53.3	54 43.1	54 32.7
16	143 21 48.3	0.64	0.0052520	14 51.0	14 49.3	54 24.3	54 18.1
17	144 19 31.2	0.62	0.0051700	14 48.3	14 47.9	54 14.3	54 12.9
18	145 17 15.8	0.57	0.0050867	14 48.2	14 49.2	54 14.0	54 17.7
19	146 15 2.1	0.50	0.0050021	14 50.9	14 53.3	54 24.0	54 32.9
20	147 12 50.1	0.41	0.0049160	14 56.4	15 0.2	54 44.3	54 58.0
21	148 10 39.7	0.30	0.0048283	15 4.6	15 9.5	55 14.0	55 32.1
22	149 8 31.1	0.18	0.0047389	15 14.9	15 20.7	55 51.9	56 13.2
23	150 6 24.2	S. 0° 05'	0.0046478	15 26.8	15 33.1	56 35.6	56 58.8
24	151 4 18.9	N. 0° 07'	0.0045549	15 39.5	15 45.9	57 22.2	57 45.5
25	152 2 15.3	0.20	0.0044601	15 52.1	15 57.9	58 8.1	58 29.6
26	153 0 13.3	0.31	0.0043634	16 3.4	16 8.3	58 49.6	59 7.5
27	153 58 12.8	0.40	0.0042648	16 12.5	16 16.0	59 23.0	59 35.8
28	154 56 13.9	0.47	0.0041643	16 18.7	16 20.6	59 45.7	59 52.6
29	155 54 16.5	0.50	0.0040619	16 21.7	16 22.0	59 56.6	59 57.7
30	156 52 20.5	0.50	0.0039577	16 21.5	16 20.3	59 55.9	59 51.6
31	157 50 26.0	0.47	0.0038519	16 18.5	16 16.2	59 45.1	59 36.6
32	158 48 32.8	N. 0° 39'	0.0037446	16 13.4	16 10.3	59 26.5	59 15.0



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	Longitude.		Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
Mon.	1	180° 52' 35".4	187° 58' 38".7	N. 4° 58' 53".7	N. 5° 8' 42".1	d 4.0	h m 3 39.0
Tues.	2	195° 5' 38".3	202° 13' 9".1	5° 13' 47".3	5° 14' 3".2	5.0	4 29.2
Wed.	3	209° 20' 47".6	216° 28' 12".2	5° 9' 29".1	5° 0' 9".5	6.0	5 20.0
Thur.	4	223° 35' 3".3	230° 41' 3".5	4° 46' 14".0	4° 27' 56".9	7.0	6 12.1
Frid.	5	237° 45' 56".9	244° 49' 28".9	4° 5' 37".2	3° 39' 37".8	8.0	7 6.1
Sat.	6	251° 51' 26".0	258° 51' 35".4	3° 10' 24".9	2° 38' 27".9	9.0	8 2.2
Sun.	7	265° 49' 44".4	272° 45' 40".6	2° 4' 18".6	1° 28' 30".6	10.0	8 59.7
Mon.	8	279° 39' 11".6	286° 30' 4".9	N. 0° 51' 38".0	N. 0° 14' 15".9	11.0	9 57.6
Tues.	9	293° 18' 7".7	300° 3' 8".1	S. 0° 23' 1".5	S. 0° 59' 41".1	12.0	10 54.3
Wed.	10	306° 44' 54".0	313° 23' 15".0	1° 35' 11".7	2° 9' 4".2	13.0	11 48.6
Thur.	11	319° 58' 1".8	326° 29' 7".2	2° 40' 53".0	3° 10' 15".3	14.0	12 39.7
Frid.	12	332° 56' 26".4	339° 19' 57".4	3° 36' 52".1	4° 0' 27".9	15.0	13 27.6
Sat.	13	345° 39' 41".4	351° 55' 43".3	4° 20' 50".6	4° 37' 51".3	16.0	14 12.8
Sun.	14	358° 8' 11".2	4° 17' 17".2	4° 51' 24".3	5° 1' 26".6	17.0	14 56.0
Mon.	15	10° 23' 17".2	16° 26' 30".4	5° 7' 57".4	5° 10' 58".0	18.0	15 38.0
Tues.	16	22° 27' 19".6	28° 26' 10".5	5° 10' 31".2	5° 6' 40".9	19.0	16 19.6
Wed.	17	34° 23' 31".9	40° 19' 54".9	4° 59' 32".6	4° 49' 12".1	20.0	17 1.9
Thur.	18	46° 15' 52".8	52° 12' 0".7	4° 35' 46".2	4° 19' 22".4	21.0	17 45.5
Frid.	19	58° 8' 54".6	64° 7' 11".6	4° 0' 8".7	3° 38' 14".0	22.0	18 31.1
Sat.	20	70° 7' 29".2	76° 10' 24".3	3° 13' 48".3	2° 47' 2".4	23.0	19 19.2
Sun.	21	82° 16' 33".0	88° 26' 29".8	2° 18' 8".9	1° 47' 22".0	24.0	20 9.8
Mon.	22	94° 40' 46".7	100° 59' 52".8	1° 14' 58".0	S. 0° 41' 15".4	25.0	21 2.7
Tues.	23	107° 24' 12".7	113° 54' 6".2	S. 0° 6' 35".7	N. 0° 28' 37".2	26.0	21 57.0
Wed.	24	120° 29' 46".9	127° 11' 21".3	N. 1° 3' 56".2	1° 38' 51".5	27.0	22 51.8
Thur.	25	133° 58' 48".7	140° 51' 59".5	2° 12' 51".2	2° 45' 21".1	28.0	23 46.1
Frid.	26	147° 50' 36".1	154° 54' 12".1	3° 13' 46".3	3° 43' 32".0	29.0	0 6
Sat.	27	162° 2' 13".1	169° 13' 57".9	4° 8' 4".6	4° 28' 53".2	0.6	0 39.5
Sun.	28	176° 28' 39".5	183° 45' 27".6	4° 45' 30".9	4° 57' 35".8	1.6	1 31.9
Mon.	29	191° 3' 29".3	198° 21' 52".9	5° 4' 52".1	5° 7' 10".9	2.6	2 23.6
Tues.	30	205° 39' 48".6	212° 56' 31".3	5° 4' 30".2	4° 56' 54".4	3.6	3 15.5
Wed.	31	220° 11' 21".1	227° 23' 45".0	4° 44' 34".8	4° 27' 48".0	4.6	4 8.1
Thur.	32	234° 33' 16".8	241° 39' 37".4	N. 4° 6' 55".4	N. 3° 42' 22".3	5.6	5 2.2



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 1.</b>				<b>WEDNESDAY 3.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	12 11 9.60	N. 4 13 13.7	131.69	0	13 56 28.33	S. 6 25 10.2	129.34
1	12 13 21.09	4 0 2.8	131.94	1	13 58 41.43	6 38 5.2	128.98
2	12 15 32.53	3 46 50.4	132.19	2	14 0 54.64	6 50 57.9	128.59
3	12 17 43.93	3 33 36.5	132.42	3	14 3 7.96	7 3 48.3	128.20
4	12 19 55.30	3 20 21.3	132.63	4	14 5 21.41	7 16 36.3	127.80
5	12 22 6.64	3 7 4.9	132.83	5	14 7 34.98	7 29 21.9	127.38
6	12 24 17.94	2 53 47.3	133.02	6	14 9 48.67	7 42 4.9	126.95
7	12 26 29.22	2 40 28.6	133.20	7	14 12 2.50	7 54 45.3	126.51
8	12 28 40.47	2 27 8.9	133.37	8	14 14 16.45	8 7 23.0	126.05
9	12 30 51.70	2 13 48.2	133.52	9	14 16 30.54	8 19 57.9	125.58
10	12 33 2.91	2 0 26.7	133.65	10	14 18 44.77	8 32 30.0	125.11
11	12 35 14.11	1 47 4.4	133.78	11	14 20 59.13	8 44 59.2	124.62
12	12 37 25.29	1 33 41.3	133.90	12	14 23 13.64	8 57 25.4	124.11
13	12 39 36.47	1 20 17.6	133.99	13	14 25 28.29	9 9 48.5	123.58
14	12 41 47.64	1 6 53.4	134.08	14	14 27 43.09	9 22 8.4	123.05
15	12 43 58.81	0 53 28.7	134.15	15	14 29 58.04	9 34 25.1	122.51
16	12 46 9.98	0 40 3.6	134.22	16	14 32 13.15	9 46 38.5	121.94
17	12 48 21.16	0 26 38.1	134.27	17	14 34 28.41	9 58 48.4	121.37
18	12 50 32.35	N. 0 13 12.4	134.30	18	14 36 43.82	10 10 54.9	120.79
19	12 52 43.54	S. 0 0 13.5	134.32	19	14 38 59.40	10 22 57.9	120.20
20	12 54 54.75	0 13 39.5	134.33	20	14 41 15.14	10 34 57.3	119.58
21	12 57 5.98	0 27 5.4	134.32	21	14 43 31.05	10 46 52.9	118.96
22	12 59 17.23	0 40 31.3	134.31	22	14 45 47.12	10 58 44.8	118.33
23	13 1 28.51	S. 0 53 57.1	134.28	23	14 48 3.35	S. 11 10 32.9	117.68
<b>TUESDAY 2.</b>				<b>THURSDAY 4.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	13 3 39.81	S. 1 7 22.7	134.24	0	14 50 19.76	S. 11 22 17.0	117.02
1	13 5 51.15	1 20 48.0	134.18	1	14 52 36.34	11 33 57.1	116.35
2	13 8 2.52	1 34 12.9	134.12	2	14 54 53.10	11 45 33.2	115.67
3	13 10 13.92	1 47 37.4	134.03	3	14 57 10.04	11 57 5.1	114.96
4	13 12 25.37	2 1 1.3	133.93	4	14 59 27.15	12 8 32.7	114.25
5	13 14 36.87	2 14 24.6	133.83	5	15 1 44.45	12 19 56.1	113.53
6	13 16 48.42	2 27 47.3	133.72	6	15 4 1.92	12 31 15.1	112.79
7	13 19 0.01	2 41 9.2	133.58	7	15 6 19.58	12 42 29.6	112.04
8	13 21 11.66	2 54 30.2	133.43	8	15 8 37.43	12 53 39.6	111.28
9	13 23 23.37	3 7 50.3	133.27	9	15 10 55.46	13 4 45.0	110.51
10	13 25 35.14	3 21 9.5	133.11	10	15 13 13.69	13 15 45.7	109.73
11	13 27 46.98	3 34 27.6	132.93	11	15 15 32.10	13 26 41.7	108.93
12	13 29 58.89	3 47 44.6	132.73	12	15 17 50.70	13 37 32.9	108.12
13	13 32 10.87	4 1 0.3	132.51	13	15 20 9.49	13 48 19.2	107.30
14	13 34 22.92	4 14 14.7	132.29	14	15 22 28.48	13 59 0.5	106.46
15	13 36 35.06	4 27 27.8	132.06	15	15 24 47.66	14 9 36.7	105.61
16	13 38 47.27	4 40 39.4	131.80	16	15 27 7.03	14 20 7.8	104.75
17	13 40 59.57	4 53 49.4	131.53	17	15 29 26.60	14 30 33.7	103.88
18	13 43 11.96	5 6 57.8	131.27	18	15 31 46.37	14 40 54.4	103.00
19	13 45 24.44	5 20 4.6	130.99	19	15 34 6.33	14 51 9.7	102.10
20	13 47 37.02	5 33 9.6	130.69	20	15 36 26.50	15 1 19.6	101.20
21	13 49 49.69	5 46 12.7	130.36	21	15 38 46.86	15 11 24.1	100.28
22	13 52 2.46	5 59 13.9	130.03	22	15 41 7.41	15 21 23.0	99.35
23	13 54 15.34	6 12 13.1	129.69	23	15 43 28.17	15 31 16.3	98.41
24	13 56 28.33	S. 6 25 10.2	129.34	24	15 45 49.13	S. 15 41 3.9	97.46



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<i>FRIDAY 5.</i>				<i>SUNDAY 7.</i>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
0	15 45 49.13	S. 15 41 3.9	97.46	0	17 42 5.99	S. 21 19 7.1	40.01
1	15 48 10.28	15 50 45.8	96.49	1	17 44 34.71	21 23 3.0	38.63
2	15 50 31.64	16 0 21.8	95.51	2	17 47 3.50	21 26 50.6	37.24
3	15 52 53.19	16 9 51.9	94.52	3	17 49 32.36	21 30 29.9	35.83
4	15 55 14.94	16 19 16.0	93.52	4	17 52 1.28	21 34 0.8	34.46
5	15 57 36.88	16 28 34.1	92.51	5	17 54 30.26	21 37 23.4	33.07
6	15 59 59.03	16 37 46.1	91.49	6	17 56 59.29	21 40 37.6	31.67
7	16 2 21.37	16 46 52.0	90.46	7	17 59 28.37	21 43 43.4	30.27
8	16 4 43.91	16 55 51.6	89.41	8	18 1 57.50	21 46 40.8	28.86
9	16 7 6.65	17 4 44.9	88.35	9	18 4 26.67	21 49 29.7	27.45
10	16 9 29.58	17 13 31.8	87.28	10	18 6 55.86	21 52 10.2	26.04
11	16 11 52.70	17 22 12.3	86.21	11	18 9 25.08	21 54 42.2	24.62
12	16 14 16.02	17 30 46.4	85.13	12	18 11 54.32	21 57 5.7	23.21
13	16 16 39.53	17 39 13.9	84.03	13	18 14 23.58	21 59 20.7	21.80
14	16 19 3.23	17 47 34.7	82.92	14	18 16 52.85	22 1 27.3	20.38
15	16 21 27.12	17 55 48.9	81.80	15	18 19 22.12	22 3 25.3	18.96
16	16 23 51.20	18 3 56.3	80.67	16	18 21 51.39	22 5 14.8	17.53
17	16 26 15.46	18 11 56.9	79.53	17	18 24 20.65	22 6 55.7	16.12
18	16 28 39.91	18 19 50.7	78.38	18	18 26 49.90	22 8 28.2	14.70
19	16 31 4.53	18 27 37.5	77.22	19	18 29 19.13	22 9 52.1	13.28
20	16 33 29.34	18 35 17.3	76.05	20	18 31 48.34	22 11 7.5	11.85
21	16 35 54.33	18 42 50.1	74.87	21	18 34 17.51	22 12 14.3	10.43
22	16 38 19.50	18 50 15.8	73.69	22	18 36 46.65	22 13 12.6	9.01
23	16 40 44.83	S. 18 57 34.4	72.49	23	18 39 15.75	S. 22 14 2.4	7.59
<i>SATURDAY 6.</i>				<i>MONDAY 8.</i>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
0	16 43 10.34	S. 19 4 45.7	71.28	0	18 41 44.80	S. 22 14 43.7	6.17
1	16 45 36.02	19 11 49.8	70.07	1	18 44 13.80	22 15 16.4	4.75
2	16 48 1.87	19 18 46.5	68.84	2	18 46 42.74	22 15 40.7	3.33
3	16 50 27.88	19 25 35.9	67.62	3	18 49 11.61	22 15 56.4	1.91
4	16 52 54.05	19 32 17.9	66.38	4	18 51 40.41	22 16 3.6	0.50
5	16 55 20.38	19 38 52.4	65.12	5	18 54 9.14	22 16 2.4	0.91
6	16 57 46.86	19 45 19.3	63.86	6	18 56 37.78	22 15 52.7	2.32
7	17 0 13.50	19 51 38.7	62.60	7	18 59 6.34	22 15 34.5	3.73
8	17 2 40.28	19 57 50.5	61.33	8	19 1 34.80	22 15 7.9	5.13
9	17 5 7.21	20 3 54.6	60.04	9	19 4 3.17	22 14 32.9	6.53
10	17 7 34.28	20 9 51.0	58.75	10	19 6 31.43	22 13 49.5	7.93
11	17 10 1.49	20 15 39.6	57.45	11	19 8 59.57	22 12 57.8	9.33
12	17 12 28.83	20 21 20.4	56.15	12	19 11 27.60	22 11 57.6	10.72
13	17 14 56.31	20 26 53.4	54.83	13	19 13 55.51	22 10 49.1	12.10
14	17 17 23.91	20 32 18.4	53.52	14	19 16 23.29	22 9 32.4	13.48
15	17 19 51.63	20 37 35.6	52.20	15	19 18 50.93	22 8 7.3	14.86
16	17 22 19.48	20 42 44.8	50.87	16	19 21 18.44	22 6 34.0	16.23
17	17 24 47.44	20 47 46.0	49.53	17	19 23 45.81	22 4 52.5	17.60
18	17 27 15.51	20 52 39.1	48.18	18	19 26 13.02	22 3 2.8	18.96
19	17 29 43.68	20 57 24.1	46.83	19	19 28 40.08	22 1 5.0	20.32
20	17 32 11.96	21 2 1.1	45.48	20	19 31 6.98	21 58 59.0	21.67
21	17 34 40.33	21 6 29.9	44.12	21	19 33 33.72	21 56 44.9	23.02
22	17 37 8.80	21 10 50.5	42.75	22	19 36 0.28	21 54 22.7	24.36
23	17 39 37.35	21 15 2.9	41.38	23	19 38 26.67	21 51 52.6	25.69
24	17 42 5.99	S. 21 19 7.1	40.01	24	19 40 52.88	S. 21 49 14.4	27.02



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>TUESDAY 9.</b>				<b>THURSDAY 11.</b>			
0	19 40 52 <sup>h m s</sup> .88	S. 21 49 14 <sup>o ' "</sup> .4	27 <sup>"</sup> .02	0	21 33 3 <sup>h m s</sup> .71	S. 17 22 38 <sup>o ' "</sup> .1	80 <sup>"</sup> .25
1	19 43 18 <sup>h m s</sup> .90	21 46 28 <sup>o ' "</sup> .3	28 <sup>"</sup> .34	1	21 35 16 <sup>h m s</sup> .89	17 14 34 <sup>o ' "</sup> .0	81 <sup>"</sup> .10
2	19 45 44 <sup>h m s</sup> .74	21 43 34 <sup>o ' "</sup> .3	29 <sup>"</sup> .65	2	21 37 29 <sup>h m s</sup> .77	17 6 24 <sup>o ' "</sup> .9	81 <sup>"</sup> .93
3	19 48 10 <sup>h m s</sup> .38	21 40 32 <sup>o ' "</sup> .5	30 <sup>"</sup> .96	3	21 39 42 <sup>h m s</sup> .33	16 58 10 <sup>o ' "</sup> .8	82 <sup>"</sup> .76
4	19 50 35 <sup>h m s</sup> .82	21 37 22 <sup>o ' "</sup> .8	32 <sup>"</sup> .27	4	21 41 54 <sup>h m s</sup> .59	16 49 51 <sup>o ' "</sup> .8	83 <sup>"</sup> .58
5	19 53 1 <sup>h m s</sup> .06	21 34 5 <sup>o ' "</sup> .3	33 <sup>"</sup> .56	5	21 44 6 <sup>h m s</sup> .54	16 41 27 <sup>o ' "</sup> .9	84 <sup>"</sup> .38
6	19 55 26 <sup>h m s</sup> .09	21 30 40 <sup>o ' "</sup> .1	34 <sup>"</sup> .84	6	21 46 18 <sup>h m s</sup> .18	16 32 59 <sup>o ' "</sup> .2	85 <sup>"</sup> .17
7	19 57 50 <sup>h m s</sup> .91	21 27 7 <sup>o ' "</sup> .2	36 <sup>"</sup> .12	7	21 48 29 <sup>h m s</sup> .51	16 24 25 <sup>o ' "</sup> .8	85 <sup>"</sup> .95
8	20 0 15 <sup>h m s</sup> .51	21 23 26 <sup>o ' "</sup> .7	37 <sup>"</sup> .38	8	21 50 40 <sup>h m s</sup> .53	16 15 47 <sup>o ' "</sup> .8	86 <sup>"</sup> .72
9	20 2 39 <sup>h m s</sup> .89	21 19 38 <sup>o ' "</sup> .6	38 <sup>"</sup> .64	9	21 52 51 <sup>h m s</sup> .24	16 7 5 <sup>o ' "</sup> .2	87 <sup>"</sup> .48
10	20 5 4 <sup>h m s</sup> .04	21 15 43 <sup>o ' "</sup> .0	39 <sup>"</sup> .90	10	21 55 1 <sup>h m s</sup> .65	15 58 18 <sup>o ' "</sup> .0	88 <sup>"</sup> .23
11	20 7 27 <sup>h m s</sup> .96	21 11 39 <sup>o ' "</sup> .8	41 <sup>"</sup> .15	11	21 57 11 <sup>h m s</sup> .76	15 49 26 <sup>o ' "</sup> .4	88 <sup>"</sup> .97
12	20 9 51 <sup>h m s</sup> .65	21 7 29 <sup>o ' "</sup> .2	42 <sup>"</sup> .38	12	21 59 21 <sup>h m s</sup> .55	15 40 30 <sup>o ' "</sup> .4	89 <sup>"</sup> .69
13	20 12 15 <sup>h m s</sup> .10	21 3 11 <sup>o ' "</sup> .2	43 <sup>"</sup> .61	13	22 1 31 <sup>h m s</sup> .04	15 31 30 <sup>o ' "</sup> .1	90 <sup>"</sup> .40
14	20 14 38 <sup>h m s</sup> .31	20 58 45 <sup>o ' "</sup> .9	44 <sup>"</sup> .83	14	22 3 40 <sup>h m s</sup> .23	15 22 25 <sup>o ' "</sup> .6	91 <sup>"</sup> .10
15	20 17 1 <sup>h m s</sup> .28	20 54 13 <sup>o ' "</sup> .3	46 <sup>"</sup> .04	15	22 5 49 <sup>h m s</sup> .12	15 13 16 <sup>o ' "</sup> .9	91 <sup>"</sup> .79
16	20 19 24 <sup>h m s</sup> .00	20 49 33 <sup>o ' "</sup> .4	47 <sup>"</sup> .24	16	22 7 57 <sup>h m s</sup> .70	15 4 4 <sup>o ' "</sup> .1	92 <sup>"</sup> .47
17	20 21 46 <sup>h m s</sup> .47	20 44 46 <sup>o ' "</sup> .4	48 <sup>"</sup> .43	17	22 10 5 <sup>h m s</sup> .98	14 54 47 <sup>o ' "</sup> .3	93 <sup>"</sup> .13
18	20 24 8 <sup>h m s</sup> .68	20 39 52 <sup>o ' "</sup> .3	49 <sup>"</sup> .61	18	22 12 13 <sup>h m s</sup> .97	14 45 26 <sup>o ' "</sup> .6	93 <sup>"</sup> .78
19	20 26 30 <sup>h m s</sup> .63	20 34 51 <sup>o ' "</sup> .1	50 <sup>"</sup> .79	19	22 14 21 <sup>h m s</sup> .65	14 36 1 <sup>o ' "</sup> .9	94 <sup>"</sup> .43
20	20 28 52 <sup>h m s</sup> .32	20 29 42 <sup>o ' "</sup> .8	51 <sup>"</sup> .96	20	22 16 29 <sup>h m s</sup> .04	14 26 33 <sup>o ' "</sup> .4	95 <sup>"</sup> .07
21	20 31 13 <sup>h m s</sup> .74	20 24 27 <sup>o ' "</sup> .6	53 <sup>"</sup> .10	21	22 18 36 <sup>h m s</sup> .14	14 17 1 <sup>o ' "</sup> .1	95 <sup>"</sup> .69
22	20 33 34 <sup>h m s</sup> .90	20 19 5 <sup>o ' "</sup> .6	54 <sup>"</sup> .24	22	22 20 42 <sup>h m s</sup> .94	14 7 25 <sup>o ' "</sup> .1	96 <sup>"</sup> .30
23	20 35 55 <sup>h m s</sup> .78	S. 20 13 36 <sup>o ' "</sup> .7	55 <sup>"</sup> .38	23	22 22 49 <sup>h m s</sup> .45	S. 13 57 45 <sup>o ' "</sup> .5	96 <sup>"</sup> .90
<b>WEDNESDAY 10.</b>				<b>FRIDAY 12.</b>			
0	20 38 16 <sup>h m s</sup> .39	S. 20 8 1 <sup>o ' "</sup> .0	56 <sup>"</sup> .51	0	22 24 55 <sup>h m s</sup> .66	S. 13 48 2 <sup>o ' "</sup> .3	97 <sup>"</sup> .49
1	20 40 36 <sup>h m s</sup> .73	20 2 18 <sup>o ' "</sup> .6	57 <sup>"</sup> .62	1	22 27 1 <sup>h m s</sup> .58	13 38 15 <sup>o ' "</sup> .6	98 <sup>"</sup> .07
2	20 42 56 <sup>h m s</sup> .78	19 56 29 <sup>o ' "</sup> .6	58 <sup>"</sup> .72	2	22 29 7 <sup>h m s</sup> .22	13 28 25 <sup>o ' "</sup> .5	98 <sup>"</sup> .63
3	20 45 16 <sup>h m s</sup> .56	19 50 34 <sup>o ' "</sup> .0	59 <sup>"</sup> .82	3	22 31 12 <sup>h m s</sup> .58	13 18 32 <sup>o ' "</sup> .0	99 <sup>"</sup> .19
4	20 47 36 <sup>h m s</sup> .05	19 44 31 <sup>o ' "</sup> .8	60 <sup>"</sup> .90	4	22 33 17 <sup>h m s</sup> .65	13 8 35 <sup>o ' "</sup> .2	99 <sup>"</sup> .73
5	20 49 55 <sup>h m s</sup> .26	19 38 23 <sup>o ' "</sup> .2	61 <sup>"</sup> .97	5	22 35 22 <sup>h m s</sup> .43	12 58 35 <sup>o ' "</sup> .2	100 <sup>"</sup> .27
6	20 52 14 <sup>h m s</sup> .18	19 32 8 <sup>o ' "</sup> .2	63 <sup>"</sup> .03	6	22 37 26 <sup>h m s</sup> .94	12 48 32 <sup>o ' "</sup> .0	100 <sup>"</sup> .80
7	20 54 32 <sup>h m s</sup> .81	19 25 46 <sup>o ' "</sup> .8	64 <sup>"</sup> .08	7	22 39 31 <sup>h m s</sup> .17	12 38 25 <sup>o ' "</sup> .6	101 <sup>"</sup> .32
8	20 56 51 <sup>h m s</sup> .14	19 19 19 <sup>o ' "</sup> .2	65 <sup>"</sup> .12	8	22 41 35 <sup>h m s</sup> .12	12 28 16 <sup>o ' "</sup> .2	101 <sup>"</sup> .82
9	20 59 9 <sup>h m s</sup> .19	19 12 45 <sup>o ' "</sup> .4	66 <sup>"</sup> .15	9	22 43 38 <sup>h m s</sup> .79	12 18 3 <sup>o ' "</sup> .8	102 <sup>"</sup> .31
10	21 1 26 <sup>h m s</sup> .94	19 6 5 <sup>o ' "</sup> .4	67 <sup>"</sup> .17	10	22 45 42 <sup>h m s</sup> .20	12 7 48 <sup>o ' "</sup> .5	102 <sup>"</sup> .78
11	21 3 44 <sup>h m s</sup> .39	18 59 19 <sup>o ' "</sup> .3	68 <sup>"</sup> .18	11	22 47 45 <sup>h m s</sup> .33	11 57 30 <sup>o ' "</sup> .4	103 <sup>"</sup> .26
12	21 6 1 <sup>h m s</sup> .54	18 52 27 <sup>o ' "</sup> .2	69 <sup>"</sup> .17	12	22 49 48 <sup>h m s</sup> .19	11 47 9 <sup>o ' "</sup> .4	103 <sup>"</sup> .73
13	21 8 18 <sup>h m s</sup> .40	18 45 29 <sup>o ' "</sup> .2	70 <sup>"</sup> .16	13	22 51 50 <sup>h m s</sup> .79	11 36 45 <sup>o ' "</sup> .7	104 <sup>"</sup> .18
14	21 10 34 <sup>h m s</sup> .95	18 38 25 <sup>o ' "</sup> .3	71 <sup>"</sup> .13	14	22 53 53 <sup>h m s</sup> .13	11 26 19 <sup>o ' "</sup> .3	104 <sup>"</sup> .62
15	21 12 51 <sup>h m s</sup> .20	18 31 15 <sup>o ' "</sup> .6	72 <sup>"</sup> .09	15	22 55 55 <sup>h m s</sup> .20	11 15 50 <sup>o ' "</sup> .3	105 <sup>"</sup> .04
16	21 15 7 <sup>h m s</sup> .15	18 24 0 <sup>o ' "</sup> .2	73 <sup>"</sup> .04	16	22 57 57 <sup>h m s</sup> .02	11 5 18 <sup>o ' "</sup> .8	105 <sup>"</sup> .46
17	21 17 22 <sup>h m s</sup> .79	18 16 39 <sup>o ' "</sup> .1	73 <sup>"</sup> .98	17	22 59 58 <sup>h m s</sup> .58	10 54 44 <sup>o ' "</sup> .8	105 <sup>"</sup> .88
18	21 19 38 <sup>h m s</sup> .13	18 9 12 <sup>o ' "</sup> .4	74 <sup>"</sup> .92	18	23 1 59 <sup>h m s</sup> .89	10 44 8 <sup>o ' "</sup> .3	106 <sup>"</sup> .28
19	21 21 53 <sup>h m s</sup> .16	18 1 40 <sup>o ' "</sup> .1	75 <sup>"</sup> .83	19	23 4 0 <sup>h m s</sup> .95	10 33 29 <sup>o ' "</sup> .5	106 <sup>"</sup> .66
20	21 24 7 <sup>h m s</sup> .89	17 54 2 <sup>o ' "</sup> .4	76 <sup>"</sup> .73	20	23 6 1 <sup>h m s</sup> .76	10 22 48 <sup>o ' "</sup> .4	107 <sup>"</sup> .04
21	21 26 22 <sup>h m s</sup> .31	17 46 19 <sup>o ' "</sup> .3	77 <sup>"</sup> .63	21	23 8 2 <sup>h m s</sup> .32	10 12 5 <sup>o ' "</sup> .0	107 <sup>"</sup> .42
22	21 28 36 <sup>h m s</sup> .42	17 38 30 <sup>o ' "</sup> .8	78 <sup>"</sup> .52	22	23 10 2 <sup>h m s</sup> .64	10 1 19 <sup>o ' "</sup> .4	107 <sup>"</sup> .78
23	21 30 50 <sup>h m s</sup> .22	17 30 37 <sup>o ' "</sup> .0	79 <sup>"</sup> .39	23	23 12 2 <sup>h m s</sup> .71	9 50 31 <sup>o ' "</sup> .7	108 <sup>"</sup> .13
24	21 33 3 <sup>h m s</sup> .71	S. 17 22 38 <sup>o ' "</sup> .1	80 <sup>"</sup> .25	24	23 14 2 <sup>h m s</sup> .55	S. 9 39 41 <sup>o ' "</sup> .9	108 <sup>"</sup> .47



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 13.</b>				<b>MONDAY 15.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
1	23 14 2.55	9 39 41.9	108.47	1	0 46 14.09	0 36 23.4	114.83
2	23 16 2.16	9 28 50.1	108.80	2	0 48 6.05	0 24 54.6	114.77
3	23 18 1.53	9 17 56.3	109.13	3	0 49 57.92	0 13 26.2	114.71
4	23 20 0.67	9 7 0.6	109.44	4	0 51 49.72	S. 0 1 58.1	114.64
5	23 21 59.59	8 56 3.0	109.74	5	0 53 41.45	N. 0 9 29.5	114.57
6	23 23 58.28	8 45 3.7	110.03	6	0 55 33.11	0 20 56.7	114.49
7	23 25 56.76	8 34 2.6	110.32	7	0 57 24.71	0 32 23.4	114.40
8	23 27 55.01	8 22 59.8	110.60	8	0 59 16.25	0 43 49.5	114.31
9	23 29 53.05	8 11 55.4	110.87	9	1 1 7.73	0 55 15.1	114.21
10	23 31 50.88	8 0 49.4	111.13	10	1 2 59.15	1 6 40.0	114.10
11	23 33 48.50	7 49 41.9	111.38	11	1 4 50.53	1 18 4.3	113.99
12	23 35 45.91	7 38 32.9	111.62	12	1 6 41.85	1 29 27.9	113.87
13	23 37 43.11	7 27 22.5	111.84	13	1 8 33.13	1 40 50.7	113.74
14	23 39 40.12	7 16 10.8	112.07	14	1 10 24.37	1 52 12.8	113.62
15	23 41 36.93	7 4 57.7	112.28	15	1 12 15.57	2 3 34.1	113.48
16	23 43 33.54	6 53 43.4	112.49	16	1 14 6.74	2 14 54.5	113.33
17	23 45 29.96	6 42 27.8	112.69	17	1 15 57.87	2 26 14.1	113.18
18	23 47 26.20	6 31 11.1	112.88	18	1 17 48.98	2 37 32.7	113.03
19	23 49 22.26	6 19 53.3	113.05	19	1 19 40.07	2 48 50.4	112.87
20	23 51 18.13	6 8 34.5	113.22	20	1 21 31.13	3 0 7.1	112.70
21	23 53 13.82	5 57 14.7	113.38	21	1 23 22.18	3 11 22.8	112.52
22	23 55 9.34	5 45 53.9	113.54	22	1 25 13.21	3 22 37.3	112.34
23	23 57 4.68	5 34 32.2	113.69	23	1 27 4.23	3 33 50.8	112.16
24	23 58 59.86	S. 5 23 9.6	113.83	24	1 28 55.25	N. 3 45 3.2	111.96
<b>SUNDAY 14.</b>				<b>TUESDAY 16.</b>			
0	0 0 54.87	S. 5 11 46.3	113.95	0	1 30 46.26	N. 3 56 14.3	111.76
1	0 2 49.72	5 0 22.2	114.08	1	1 32 37.27	4 7 24.3	111.56
2	0 4 44.41	4 48 57.3	114.20	2	1 34 28.29	4 18 33.0	111.34
3	0 6 38.94	4 37 31.8	114.30	3	1 36 19.31	4 29 40.4	111.13
4	0 8 33.32	4 26 5.7	114.40	4	1 38 10.34	4 40 46.5	110.91
5	0 10 27.55	4 14 39.0	114.49	5	1 40 1.39	4 51 51.3	110.68
6	0 12 21.64	4 3 11.8	114.57	6	1 41 52.45	5 2 54.7	110.44
7	0 14 15.59	3 51 44.1	114.65	7	1 43 43.54	5 13 56.6	110.19
8	0 16 9.39	3 40 16.0	114.72	8	1 45 34.64	5 24 57.0	109.95
9	0 18 3.06	3 28 47.5	114.78	9	1 47 25.77	5 35 56.0	109.70
10	0 19 56.60	3 17 18.6	114.84	10	1 49 16.93	5 46 53.4	109.44
11	0 21 50.01	3 5 49.4	114.88	11	1 51 8.13	5 57 49.3	109.17
12	0 23 43.29	2 54 20.1	114.91	12	1 52 59.36	6 8 43.5	108.90
13	0 25 36.45	2 42 50.5	114.95	13	1 54 50.63	6 19 36.1	108.62
14	0 27 29.49	2 31 20.7	114.97	14	1 56 41.94	6 30 27.0	108.34
15	0 29 22.41	2 19 50.9	114.98	15	1 58 33.30	6 41 16.2	108.06
16	0 31 15.23	2 8 20.9	115.00	16	2 0 24.71	6 52 3.7	107.77
17	0 33 7.93	1 56 50.9	115.00	17	2 2 16.17	7 2 49.4	107.46
18	0 35 0.53	1 45 20.9	114.99	18	2 4 7.69	7 13 33.2	107.15
19	0 36 53.02	1 33 51.0	114.98	19	2 5 59.27	7 24 15.2	106.84
20	0 38 45.42	1 22 21.1	114.97	20	2 7 50.91	7 34 55.3	106.52
21	0 40 37.72	1 10 51.4	114.94	21	2 9 42.61	7 45 33.5	106.20
22	0 42 29.93	0 59 21.9	114.91	22	2 11 34.39	7 56 9.7	105.87
23	0 44 22.05	0 47 52.5	114.88	23	2 13 26.23	8 6 44.0	105.54
24	0 46 14.09	S. 0 36 23.4	114.83	24	2 15 18.15	N. 8 17 16.2	105.19



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 17.</b>				<b>FRIDAY 19.</b>			
0	h m s 15 18.15	N. 8 17 16.2	105.19	0	h m s 3 47 17.01	N. 15 51 26.3	81.64
1	2 17 10.15	8 27 46.3	104.85	1	3 49 16.15	15 59 34.2	80.99
2	2 19 2.23	8 38 14.4	104.50	2	3 51 15.50	16 7 38.2	80.32
3	2 20 54.40	8 48 40.3	104.13	3	3 53 15.06	16 15 38.2	79.67
4	2 22 46.65	8 59 4.0	103.77	4	3 55 14.83	16 23 34.3	79.01
5	2 24 38.99	9 9 25.6	103.41	5	3 57 14.81	16 31 26.3	78.33
6	2 26 31.43	9 19 44.9	103.03	6	3 59 15.02	16 39 14.2	77.64
7	2 28 23.97	9 30 1.9	102.64	7	4 1 15.44	16 46 58.0	76.96
8	2 30 16.60	9 40 16.6	102.25	8	4 3 16.08	16 54 37.7	76.26
9	2 32 9.34	9 50 28.9	101.86	9	4 5 16.95	17 2 13.1	75.55
10	2 34 2.19	10 0 38.9	101.46	10	4 7 18.04	17 9 44.3	74.84
11	2 35 55.14	10 10 46.4	101.04	11	4 9 19.35	17 17 11.2	74.12
12	2 37 48.20	10 20 51.4	100.63	12	4 11 20.89	17 24 33.8	73.40
13	2 39 41.38	10 30 54.0	100.22	13	4 13 22.66	17 31 52.0	72.67
14	2 41 34.68	10 40 54.0	99.79	14	4 15 24.66	17 39 5.8	71.93
15	2 43 28.10	10 50 51.5	99.37	15	4 17 26.89	17 46 15.1	71.18
16	2 45 21.64	11 0 46.4	98.93	16	4 19 29.35	17 53 19.9	70.43
17	2 47 15.31	11 10 38.6	98.48	17	4 21 32.04	18 0 20.2	69.67
18	2 49 9.11	11 20 28.2	98.04	18	4 23 34.97	18 7 15.9	68.90
19	2 51 3.04	11 30 15.1	97.58	19	4 25 38.14	18 14 7.0	68.12
20	2 52 57.11	11 39 59.2	97.12	20	4 27 41.55	18 20 53.3	67.33
21	2 54 51.32	11 49 40.5	96.65	21	4 29 45.19	18 27 35.0	66.54
22	2 56 45.67	11 59 19.0	96.18	22	4 31 49.07	18 34 11.9	65.74
23	2 58 40.16	N. 12 8 54.7	95.71	23	4 33 53.19	N. 18 40 43.9	64.93
<b>THURSDAY 18.</b>				<b>SATURDAY 20.</b>			
0	3 0 34.80	N. 12 18 27.5	95.22	0	4 35 57.56	N. 18 47 11.1	64.12
1	3 2 29.59	12 27 57.3	94.72	1	4 38 2.17	18 53 33.4	63.31
2	3 4 24.53	12 37 24.2	94.22	2	4 40 7.02	18 59 50.8	62.48
3	3 6 19.63	12 46 48.0	93.72	3	4 42 12.11	19 6 3.2	61.65
4	3 8 14.88	12 56 8.8	93.22	4	4 44 17.45	19 12 10.6	60.81
5	3 10 10.29	13 5 26.6	92.70	5	4 46 23.03	19 18 12.9	59.96
6	3 12 5.87	13 14 41.2	92.17	6	4 48 28.86	19 24 10.1	59.10
7	3 14 1.62	13 23 52.6	91.64	7	4 50 34.94	19 30 2.1	58.23
8	3 15 57.53	13 33 0.9	91.11	8	4 52 41.26	19 35 48.9	57.37
9	3 17 53.62	13 42 5.9	90.56	9	4 54 47.82	19 41 30.5	56.48
10	3 19 49.88	13 51 7.6	90.01	10	4 56 54.63	19 47 6.7	55.59
11	3 21 46.31	14 0 6.0	89.46	11	4 59 1.69	19 52 37.6	54.70
12	3 23 42.92	14 9 1.1	88.90	12	5 1 9.00	19 58 3.1	53.80
13	3 25 39.71	14 17 52.8	88.33	13	5 3 16.55	20 3 23.2	52.89
14	3 27 36.69	14 26 41.0	87.75	14	5 5 24.36	20 8 37.8	51.97
15	3 29 33.85	14 35 25.8	87.17	15	5 7 32.41	20 13 46.9	51.05
16	3 31 31.20	14 44 7.1	86.58	16	5 9 40.70	20 18 50.4	50.12
17	3 33 28.74	14 52 44.8	85.99	17	5 11 49.25	20 23 48.3	49.18
18	3 35 26.47	15 1 19.0	85.39	18	5 13 58.04	20 28 40.6	48.24
19	3 37 24.39	15 9 49.5	84.78	19	5 16 7.07	20 33 27.2	47.28
20	3 39 22.51	15 18 16.4	84.17	20	5 18 16.36	20 38 8.0	46.32
21	3 41 20.84	15 26 39.5	83.54	21	5 20 25.89	20 42 43.0	45.35
22	3 43 19.36	15 34 58.9	82.92	22	5 22 35.66	20 47 12.2	44.38
23	3 45 18.08	15 43 14.5	82.28	23	5 24 45.68	20 51 35.5	43.40
24	3 47 17.01	N. 15 51 26.3	81.64	24	5 26 55.95	N. 20 55 53.0	42.42



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 21.</b>				<b>TUESDAY 23.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	5 26 55.95	N.20 55 53.0	42.42	0	7 15 23.78	N.22 12 47.3	12.55
1	5 29 6.46	21 0 4.5	41.41	1	7 17 43.67	22 11 28.2	13.81
2	5 31 17.21	21 4 9.9	40.40	2	7 20 3.68	22 10 1.6	15.08
3	5 33 28.20	21 8 9.3	39.39	3	7 22 23.81	22 8 27.3	16.34
4	5 35 39.43	21 12 2.6	38.37	4	7 24 44.06	22 6 45.5	17.61
5	5 37 50.90	21 15 49.8	37.34	5	7 27 4.42	22 4 56.0	18.89
6	5 40 2.61	21 19 30.7	36.31	6	7 29 24.88	22 2 58.8	20.17
7	5 42 14.56	21 23 5.5	35.27	7	7 31 45.45	22 0 54.0	21.44
8	5 44 26.74	21 26 34.0	34.23	8	7 34 6.12	21 58 41.6	22.72
9	5 46 39.15	21 29 56.3	33.18	9	7 36 26.88	21 56 21.4	24.00
10	5 48 51.80	21 33 12.2	32.12	10	7 38 47.74	21 53 53.6	25.28
11	5 51 4.68	21 36 21.7	31.04	11	7 41 8.68	21 51 18.1	26.56
12	5 53 17.78	21 39 24.7	29.97	12	7 43 29.71	21 48 34.9	27.84
13	5 55 31.12	21 42 21.3	28.89	13	7 45 50.82	21 45 44.0	29.13
14	5 57 44.68	21 45 11.4	27.80	14	7 48 12.00	21 42 45.3	30.42
15	5 59 58.46	21 47 54.9	26.71	15	7 50 33.26	21 39 39.0	31.70
16	6 2 12.47	21 50 31.9	25.61	16	7 52 54.58	21 36 24.9	32.99
17	6 4 26.70	21 53 2.2	24.50	17	7 55 15.97	21 33 3.1	34.27
18	6 6 41.15	21 55 25.9	23.39	18	7 57 37.42	21 29 33.6	35.56
19	6 8 55.81	21 57 42.9	22.27	19	7 59 58.92	21 25 56.4	36.84
20	6 11 10.69	21 59 53.1	21.13	20	8 2 20.47	21 22 11.5	38.13
21	6 13 25.78	22 1 56.5	20.01	21	8 4 42.08	21 18 18.9	39.42
22	6 15 41.08	22 3 53.2	18.88	22	8 7 3.73	21 14 18.5	40.70
23	6 17 56.59	N.22 5 43.1	17.73	23	8 9 25.41	N.21 10 10.5	41.98
<b>MONDAY 22.</b>				<b>WEDNESDAY 24.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	6 20 12.31	N.22 7 26.0	16.58	0	8 11 47.14	N.21 5 54.7	43.27
1	6 22 28.23	22 9 2.0	15.42	1	8 14 8.90	21 1 31.3	44.55
2	6 24 44.35	22 10 31.0	14.26	2	8 16 30.68	20 57 0.1	45.83
3	6 27 0.67	22 11 53.1	13.09	3	8 18 52.49	20 52 21.3	47.11
4	6 29 17.18	22 13 8.1	11.92	4	8 21 14.32	20 47 34.8	48.38
5	6 31 33.89	22 14 16.1	10.74	5	8 23 36.17	20 42 40.7	49.65
6	6 33 50.78	22 15 17.0	9.55	6	8 25 58.04	20 37 39.0	50.92
7	6 36 7.86	22 16 10.7	8.36	7	8 28 19.91	20 32 29.7	52.19
8	6 38 25.13	22 16 57.3	7.17	8	8 30 41.78	20 27 12.7	53.46
9	6 40 42.58	22 17 36.8	5.97	9	8 33 3.66	20 21 48.2	54.72
10	6 43 0.20	22 18 9.0	4.76	10	8 35 25.54	20 16 16.1	55.97
11	6 45 18.00	22 18 33.9	3.55	11	8 37 47.42	20 10 36.5	57.23
12	6 47 35.97	22 18 51.6	2.34	12	8 40 9.29	20 4 49.3	58.49
13	6 49 54.11	22 19 2.0	1.12	13	8 42 31.15	19 58 54.6	59.73
14	6 52 12.41	22 19 5.0	0.11	14	8 44 52.99	19 52 52.5	60.98
15	6 54 30.88	22 19 0.7	1.33	15	8 47 14.81	19 46 42.9	62.23
16	6 56 49.50	22 18 49.1	2.56	16	8 49 36.62	19 40 25.8	63.47
17	6 59 8.28	22 18 30.0	3.80	17	8 51 58.40	19 34 1.3	64.69
18	7 1 27.21	22 18 3.5	5.04	18	8 54 20.15	19 27 29.5	65.92
19	7 3 46.29	22 17 29.5	6.28	19	8 56 41.87	19 20 50.3	67.14
20	7 6 5.52	22 16 48.1	7.53	20	8 59 3.55	19 14 3.8	68.35
21	7 8 24.88	22 15 59.2	8.78	21	9 1 25.20	19 7 10.1	69.57
22	7 10 44.38	22 15 2.7	10.03	22	9 3 46.81	19 0 9.0	70.78
23	7 13 4.02	22 13 58.8	11.28	23	9 6 8.37	18 53 0.7	71.98
24	7 15 23.78	N.22 12 47.3	12.55	24	9 8 29.89	N.18 45 45.3	73.17



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 25.</b>				<b>SATURDAY 27.</b>			
0	h m s	N. 18 45 45.3	73.17	0	h m s	N. 10 52 11.3	120.29
1	9 10 51.36	18 38 22.7	74.36	1	11 2 27.25	10 40 7.4	121.00
2	9 13 12.78	18 30 53.0	75.54	2	11 4 44.41	10 27 59.3	121.70
3	9 15 34.14	18 23 16.2	76.72	3	11 7 1.47	10 15 47.0	122.39
4	9 17 55.45	18 15 32.4	77.88	4	11 9 18.43	10 3 30.6	123.06
5	9 20 16.69	18 7 41.6	79.05	5	11 11 35.30	9 51 10.3	123.70
6	9 22 37.88	17 59 43.8	80.21	6	11 13 52.09	9 38 46.2	124.34
7	9 24 59.00	17 51 39.1	81.36	7	11 16 8.78	9 26 18.2	124.98
8	9 27 20.05	17 43 27.5	82.50	8	11 18 25.38	9 13 46.4	125.60
9	9 29 41.03	17 35 9.1	83.63	9	11 20 41.89	9 1 11.0	126.19
10	9 32 1.94	17 26 43.9	84.76	10	11 22 58.32	8 48 32.1	126.78
11	9 34 22.78	17 18 12.0	85.88	11	11 25 14.66	8 35 49.7	127.36
12	9 36 43.54	17 9 33.3	87.00	12	11 27 30.91	8 23 3.8	127.93
13	9 39 4.23	17 0 48.0	88.09	13	11 29 47.09	8 10 14.6	128.47
14	9 41 24.83	16 51 56.2	89.18	14	11 32 3.18	7 57 22.2	128.99
15	9 43 45.36	16 42 57.8	90.27	15	11 34 19.20	7 44 26.7	129.51
16	9 46 5.80	16 33 53.0	91.34	16	11 36 35.13	7 31 28.1	130.02
17	9 48 26.16	16 24 41.7	92.42	17	11 38 50.99	7 18 26.5	130.52
18	9 50 46.44	16 15 24.0	93.48	18	11 41 6.78	7 5 21.9	130.99
19	9 53 6.62	16 6 0.0	94.53	19	11 43 22.50	6 52 14.6	131.44
20	9 55 26.72	15 56 29.7	95.57	20	11 45 38.15	6 39 4.6	131.89
21	9 57 46.73	15 46 53.2	96.59	21	11 47 53.72	6 25 51.9	132.33
22	10 0 6.64	15 37 10.6	97.61	22	11 50 9.23	6 12 36.7	132.74
23	10 2 26.46	N. 15 27 21.9	98.62	23	11 52 24.68	N. 5 59 19.0	133.14
<b>FRIDAY 26.</b>				<b>SUNDAY 28.</b>			
0	10 4 46.19	N. 15 17 27.1	99.62	0	11 54 40.06	N. 5 45 59.0	133.53
1	10 7 5.82	15 7 26.4	100.62	1	11 56 55.38	5 32 36.7	133.91
2	10 9 25.36	14 57 19.7	101.60	2	11 59 10.65	5 19 12.1	134.27
3	10 11 44.80	14 47 7.2	102.57	3	12 1 25.86	5 5 45.4	134.62
4	10 14 4.15	14 36 48.9	103.53	4	12 3 41.02	4 52 16.7	134.94
5	10 16 23.39	14 26 24.9	104.48	5	12 5 56.13	4 38 46.1	135.26
6	10 18 42.53	14 15 55.2	105.42	6	12 8 11.19	4 25 13.6	135.57
7	10 21 1.58	14 5 19.9	106.34	7	12 10 26.20	4 11 39.3	135.85
8	10 23 20.53	13 54 39.1	107.26	8	12 12 41.17	3 58 3.4	136.12
9	10 25 39.38	13 43 52.8	108.17	9	12 14 56.10	3 44 25.9	136.38
10	10 27 58.12	13 33 1.1	109.06	10	12 17 10.98	3 30 46.9	136.62
11	10 30 16.77	13 22 4.1	109.93	11	12 19 25.83	3 17 6.5	136.85
12	10 32 35.31	13 11 1.9	110.80	12	12 21 40.64	3 3 24.7	137.07
13	10 34 53.75	12 59 54.5	111.67	13	12 23 55.42	2 49 41.7	137.26
14	10 37 12.09	12 48 41.9	112.52	14	12 26 10.18	2 35 57.6	137.44
15	10 39 30.33	12 37 24.3	113.34	15	12 28 24.90	2 22 12.4	137.61
16	10 41 48.47	12 26 1.8	114.17	16	12 30 39.60	2 8 26.3	137.76
17	10 44 6.51	12 14 34.3	114.98	17	12 32 54.29	1 54 39.3	137.90
18	10 46 24.45	12 3 2.0	115.77	18	12 35 8.95	1 40 51.5	138.02
19	10 48 42.29	11 51 25.0	116.56	19	12 37 23.59	1 27 3.0	138.13
20	10 51 0.03	11 39 43.3	117.33	20	12 39 38.22	1 13 13.9	138.23
21	10 53 17.67	11 27 57.0	118.09	21	12 41 52.85	0 59 24.3	138.31
22	10 55 35.21	11 16 6.2	118.84	22	12 44 7.46	0 45 34.2	138.37
23	10 57 52.65	11 4 10.9	119.57	23	12 46 22.07	0 31 43.8	138.42
24	11 0 10.00	N. 10 52 11.3	120.29	24	12 48 36.68	N. 0 17 53.2	138.45



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
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## MONDAY 29.

h	m	s	N.	°	'	"
0	12	48	36	68	N. 0	17 53' 2
1	12	50	51	29	N. 0	4 2' 4
2	12	53	5	90	S.	0 9 48' 5
3	12	55	20	51	0	23 39' 3
4	12	57	35	14	0	37 30' 0
5	12	59	49	77	0	51 20' 5
6	13	2	4	42	1	5 10' 8
7	13	4	19	09	1	19 0' 7
8	13	6	33	78	1	32 50' 1
9	13	8	48	49	1	46 38' 9
10	13	11	3	23	2	0 27' 1
11	13	13	17	99	2	14 14' 5
12	13	15	32	79	2	28 1' 1
13	13	17	47	62	2	41 46' 8
14	13	20	2	49	2	55 31' 5
15	13	22	17	40	3	9 15' 1
16	13	24	32	35	3	22 57' 6
17	13	26	47	35	3	36 38' 8
18	13	29	2	39	3	50 18' 6
19	13	31	17	49	4	3 57' 0
20	13	33	32	64	4	17 33' 8
21	13	35	47	84	4	31 9' 0
22	13	38	3	11	4	44 42' 6
23	13	40	18	44	S. 4	58 14' 4

## TUESDAY 30.

h	m	s	S.	°	'	"
0	13	42	33	83	S. 5	11 44' 2
1	13	44	49	29	5	25 12' 1
2	13	47	4	82	5	38 38' 0
3	13	49	20	42	5	52 1' 7
4	13	51	36	10	6	5 23' 2
5	13	53	51	86	6	18 42' 5
6	13	56	7	70	6	31 59' 3
7	13	58	23	62	6	45 13' 6
8	14	0	39	63	6	58 25' 4
9	14	2	55	72	7	11 34' 6
10	14	5	11	91	7	24 41' 0
11	14	7	28	19	7	37 44' 6
12	14	9	44	56	7	50 45' 3
13	14	12	1	03	8	3 43' 0
14	14	14	17	61	8	16 37' 6
15	14	16	34	29	8	29 29' 1
16	14	18	51	07	8	42 17' 4
17	14	21	7	96	8	55 2' 3
18	14	23	24	96	9	7 43' 8
19	14	25	42	07	9	20 21' 9
20	14	27	59	30	9	32 56' 4
21	14	30	16	64	9	45 27' 3
22	14	32	34	10	9	57 54' 4
23	14	34	51	68	10	10 17' 7
24	14	37	9	38	S. 10	22 37' 2

## WEDNESDAY 31.

h	m	s	S.	°	'	"
0	14	37	9	38	S. 10	22 37' 2
1	14	39	27	20	10	34 52' 7
2	14	41	45	15	10	47 4' 2
3	14	44	3	23	10	59 11' 5
4	14	46	21	43	11	11 14' 6
5	14	48	39	77	11	23 13' 5
6	14	50	58	24	11	35 8' 0
7	14	53	16	84	11	46 58' 1
8	14	55	35	58	11	58 43' 7
9	14	57	54	45	12	10 24' 7
10	15	0	13	46	12	22 1' 0
11	15	2	32	61	12	33 32' 6
12	15	4	51	91	12	44 59' 3
13	15	7	11	34	12	56 21' 2
14	15	9	30	92	13	7 38' 1
15	15	11	50	64	13	18 50' 0
16	15	14	10	50	13	29 56' 8
17	15	16	30	51	13	40 58' 4
18	15	18	50	67	13	51 54' 8
19	15	21	10	97	14	2 45' 9
20	15	23	31	42	14	13 31' 5
21	15	25	52	02	14	24 11' 7
22	15	28	12	77	14	34 46' 4
23	15	30	33	67	S. 14	45 15' 5

## THURSDAY, SEPT. 1.

0	15	32	54	71	S. 14	55 38' 9	103' 43
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## PHASES OF THE MOON.

	h	m
Aug. 3	) First Quarter	- 20 51' 5
10	○ Full Moon	- 21 13' 2
18	☾ Last Quarter	- 19 50' 3
26	● New Moon	- 9 25' 7

	h
Aug. 3	☾ Perigee - - - - 2
17	☾ Apogee - - - - 13
29	☾ Perigee - - - - 11



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	SUN W.	52 4 15	2604	53 43 4	2602	55 21 57	2599	57 0 53	2596
	Antares E.	67 40 22	2348	65 55 33	2347	64 10 42	2346	62 25 50	2346
	Saturn E.	81 28 19	2287	79 42 1	2285	77 55 40	2282	76 9 14	2281
2	SUN W.	65 16 18	2588	66 55 29	2587	68 34 42	2586	70 13 56	2586
	Antares E.	53 41 33	2350	51 56 47	2353	50 12 4	2355	48 27 25	2359
	Saturn E.	67 16 49	2273	65 29 50	2272	63 43 9	2272	61 56 28	2271
	$\alpha$ Aquilæ E.	100 15 22	2936	98 43 49	2928	97 12 6	2923	95 40 17	2918
3	SUN W.	78 30 13	2585	80 9 28	2585	81 48 43	2586	83 27 57	2587
	Antares E.	39 45 51	2390	38 2 1	2399	36 18 25	2409	34 35 3	2422
	Saturn E.	53 2 55	2271	51 16 13	2271	49 29 31	2272	47 42 51	2273
	$\alpha$ Aquilæ E.	88 0 13	2914	86 28 12	2917	84 56 15	2921	83 24 23	2926
4	SUN W.	91 43 48	2593	93 22 53	2595	95 1 55	2596	96 40 56	2599
	Spica W.	22 35 19	2520	24 16 5	2492	25 57 30	2469	27 39 27	2450
	Saturn E.	38 49 50	2279	37 3 20	2281	35 16 53	2283	33 30 28	2285
	$\alpha$ Aquilæ E.	75 47 14	2973	74 16 27	2986	72 45 56	3001	71 15 45	3018
	Fomalhaut E.	108 55 10	2515	107 14 18	2513	105 33 23	2511	103 52 25	2509
5	SUN W.	104 55 13	2610	106 33 55	2613	108 12 32	2615	109 51 6	2619
	Spica W.	36 14 14	2400	37 57 48	2396	39 41 29	2392	41 25 16	2389
	$\alpha$ Aquilæ E.	63 50 46	3132	62 23 15	3162	60 56 20	3194	59 30 4	3230
	Fomalhaut E.	95 27 16	2510	93 46 16	2511	92 5 18	2514	90 24 24	2516
	$\alpha$ Pegasi E.	110 57 30	2755	109 22 3	2749	107 46 28	2742	106 10 44	2737
6	SUN W.	118 2 44	2637	119 40 49	2642	121 18 47	2646	122 56 40	2651
	Spica W.	50 4 50	2385	51 48 46	2386	53 32 41	2387	55 16 34	2389
	$\alpha$ Aquilæ E.	52 30 37	3467	51 9 36	3529	49 49 44	3598	48 31 7	3673
	Fomalhaut E.	82 1 2	2538	80 20 41	2543	78 40 28	2550	77 0 24	2558
	$\alpha$ Pegasi E.	98 10 56	2728	96 34 53	2729	94 58 51	2731	93 22 52	2733
7	Spica W.	63 55 6	2404	65 38 35	2408	67 21 58	2412	69 5 15	2417
	Antares W.	19 3 1	2760	20 38 22	2706	22 14 54	2664	23 52 23	2632
	Fomalhaut E.	68 42 52	2603	67 4 1	2615	65 25 26	2627	63 47 8	2640
	$\alpha$ Pegasi E.	85 24 10	2759	83 48 48	2767	82 13 37	2776	80 38 37	2785
8	Spica W.	77 39 54	2445	79 22 25	2451	81 4 47	2458	82 47 0	2465
	Antares W.	32 7 49	2554	33 47 47	2549	35 27 52	2545	37 8 3	2542
	Saturn W.	17 28 17	2408	19 11 40	2414	20 54 54	2420	22 38 0	2426
	Fomalhaut E.	55 40 34	2724	54 4 26	2745	52 28 46	2767	50 53 35	2792
	$\alpha$ Pegasi E.	72 47 10	2848	71 13 44	2864	69 40 39	2881	68 7 55	2899
9	Spica W.	91 15 30	2503	92 56 39	2512	94 37 36	2521	96 18 20	2530
	Antares W.	45 29 8	2550	47 9 12	2554	48 49 10	2559	50 29 2	2564
	Saturn W.	31 11 5	2463	32 53 10	2472	34 35 3	2480	36 16 45	2489
	Fomalhaut E.	43 6 40	2952	41 35 27	2994	40 5 6	3041	38 35 44	3093
	$\alpha$ Pegasi E.	60 30 45	3013	59 0 49	3042	57 31 29	3072	56 2 45	3105
10	Antares W.	58 46 14	2599	60 25 10	2607	62 3 55	2615	63 42 29	2625
	Saturn W.	44 42 1	2535	46 22 25	2546	48 2 34	2556	49 42 30	2566
	$\alpha$ Pegasi E.	48 50 8	3313	47 26 12	3365	46 3 16	3423	44 41 25	3486
	$\alpha$ Arietis E.	89 23 24	2692	87 46 33	2702	86 9 56	2713	84 33 33	2725
11	Antares W.	71 52 8	2673	73 29 24	2684	75 6 26	2695	76 43 13	2705



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.		Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	SUN	W.	58° 39' 53"	2594	60° 18' 56"	2593	61° 58' 1"	2591	63° 37' 9"	2590
	Antares	E.	60 40 58	2346	58 56 5	2346	57 11 13	2347	55 26 22	2348
	Saturn	E.	74 22 46	2279	72 36 15	2277	70 49 42	2275	69 3 6	2274
2	SUN	W.	71 53 10	2585	73 32 26	2585	75 11 41	2585	76 50 57	2585
	Antares	E.	46 42 52	2364	44 58 25	2369	43 14 5	2374	41 29 53	2381
	Saturn	E.	60 9 46	2270	58 23 3	2271	56 36 21	2270	54 49 38	2270
	α Aquilæ	E.	94 8 21	2915	92 36 21	2913	91 4 19	2912	89 32 16	2912
3	SUN	W.	85 7 10	2588	86 46 22	2589	88 25 32	2590	90 4 41	2591
	Antares	E.	32 52 0	2437	31 9 18	2455	29 27 1	2476	27 45 14	2501
	Saturn	E.	45 56 12	2274	44 9 34	2275	42 22 57	2276	40 36 23	2277
	α Aquilæ	E.	81 52 37	2933	80 21 0	2941	78 49 33	2950	77 18 17	2960
4	SUN	W.	98 19 53	2600	99 58 48	2602	101 37 40	2605	103 16 28	2607
	Spica	W.	29 21 50	2436	31 4 33	2424	32 47 34	2414	34 30 48	2406
	Saturn	E.	31 44 6	2287	29 57 47	2290	28 11 33	2292	26 25 21	2295
	α Aquilæ	E.	69 45 54	3036	68 16 26	3057	66 47 24	3080	65 18 50	3105
	Fomalhaut	E.	102 11 25	2508	100 30 23	2507	98 49 20	2507	97 8 17	2509
5	SUN	W.	111 29 35	2622	113 8 0	2626	114 46 20	2629	116 24 35	2634
	Spica	W.	43 9 7	2387	44 53 1	2386	46 36 56	2385	48 20 53	2385
	α Aquilæ	E.	58 4 30	3270	56 39 43	3312	55 15 45	3359	53 52 42	3410
	Fomalhaut	E.	88 43 33	2519	87 2 46	2523	85 22 5	2527	83 41 30	2532
	α Pegasi	E.	104 34 54	2734	102 58 59	2731	101 23 0	2729	99 46 58	2728
6	SUN	W.	124 34 26	2655	126 12 6	2660	127 49 39	2666	129 27 5	2671
	Spica	W.	57 0 24	2391	58 44 11	2394	60 27 54	2398	62 11 32	2401
	α Aquilæ	E.	47 13 51	3756	45 58 3	3848	44 43 50	3950	43 31 21	4063
	Fomalhaut	E.	75 20 31	2565	73 40 47	2574	72 1 16	2583	70 21 57	2593
	α Pegasi	E.	91 46 56	2737	90 11 5	2741	88 35 20	2746	86 59 41	2752
7	Spica	W.	70 48 26	2422	72 31 29	2427	74 14 25	2432	75 57 14	2438
	Antares	W.	25 30 35	2607	27 9 20	2588	28 48 31	2574	30 28 2	2562
	Fomalhaut	E.	62 9 7	2654	60 31 26	2670	58 54 6	2687	57 17 8	2705
	α Pegasi	E.	79 3 49	2796	77 29 16	2807	75 54 57	2820	74 20 55	2833
8	Spica	W.	84 29 3	2472	86 10 56	2479	87 52 39	2487	89 34 10	2495
	Antares	W.	38 48 18	2542	40 28 33	2543	42 8 47	2544	43 48 59	2546
	Saturn	W.	24 20 57	2433	26 3 45	2440	27 46 22	2448	29 28 49	2455
	Fomalhaut	E.	49 18 56	2819	47 44 52	2848	46 11 26	2879	44 38 41	2914
	α Pegasi	E.	66 35 35	2919	65 3 41	2940	63 32 13	2963	62 1 14	2987
9	Spica	W.	97 58 51	2539	99 39 10	2549	101 19 15	2559	102 59 6	2569
	Antares	W.	52 8 46	2570	53 48 22	2577	55 27 49	2584	57 7 6	2591
	Saturn	W.	37 58 14	2498	39 39 30	2507	41 20 34	2517	43 1 24	2526
	Fomalhaut	E.	37 7 25	3150	35 40 16	3215	34 14 24	3288	32 49 58	3371
	α Pegasi	E.	54 34 42	3141	53 7 22	3179	51 40 47	3220	50 15 1	3265
10	Antares	W.	65 20 50	2634	66 58 59	2643	68 36 56	2653	70 14 39	2663
	Saturn	W.	51 22 11	2577	53 1 38	2588	54 40 50	2599	56 19 47	2610
	α Pegasi	E.	43 20 45	3554	42 1 20	3630	40 43 18	3713	39 26 44	3804
	α Arietis	E.	82 57 26	2736	81 21 33	2748	79 45 57	2760	78 10 37	2773
11	Antares	W.	78 19 46	2716	79 56 5	2728	81 32 8	2738	83 7 57	2750



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
11	Saturn W.	57 58 29	2621	59 36 56	2632	61 15 8	2643	62 53 5	2654
	α Arietis E.	76 35 34	2786	75 0 48	2800	73 26 20	2814	71 52 11	2828
	Aldebaran E.	107 38 1	2630	105 59 47	2642	104 21 49	2652	102 44 5	2664
	Jupiter E.	120 19 49	2686	118 42 51	2698	117 6 9	2709	115 29 41	2721
12	Saturn W.	70 58 54	2713	72 35 17	2725	74 11 24	2737	75 47 15	2748
	α Aquilæ W.	45 38 44	4158	46 47 50	4095	47 57 56	4039	49 8 57	3989
	α Arietis E.	64 6 15	2908	62 34 6	2925	61 2 19	2943	59 30 55	2961
	Aldebaran E.	94 39 19	2722	93 3 8	2734	91 27 14	2745	89 51 34	2757
	Jupiter E.	107 31 14	2779	105 56 19	2791	104 21 39	2803	102 47 15	2814
13	Saturn W.	83 42 40	2806	85 17 0	2818	86 51 4	2830	88 24 53	2841
	α Aquilæ W.	55 14 47	3812	56 29 36	3788	57 44 51	3766	59 0 29	3747
	α Arietis E.	51 59 55	3064	50 31 1	3086	49 2 35	3110	47 34 38	3136
	Aldebaran E.	81 57 9	2816	80 23 2	2827	78 49 9	2839	77 15 32	2850
	Jupiter E.	94 59 2	2873	93 26 9	2884	91 53 30	2896	90 21 6	2908
14	Saturn W.	96 10 24	2895	97 42 49	2906	99 15 0	2916	100 46 59	2926
	α Aquilæ W.	65 22 46	3684	66 39 50	3677	67 57 1	3670	69 14 20	3665
	α Arietis E.	40 23 6	3287	38 58 39	3323	37 34 54	3363	36 11 55	3407
	Aldebaran E.	69 30 59	2905	67 58 46	2915	66 26 46	2925	64 54 59	2935
	Jupiter E.	82 42 40	2962	81 11 39	2973	79 40 52	2982	78 10 17	2993
	Mars E.	105 40 51	3138	104 13 28	3149	102 46 18	3159	101 19 20	3170
15	α Aquilæ W.	75 41 54	3654	76 59 30	3654	78 17 6	3654	79 34 42	3656
	Fomalhaut W.	40 27 30	3287	41 48 9	3467	43 9 10	3448	44 30 33	3432
	Aldebaran E.	57 19 7	2981	55 48 31	2989	54 18 5	2997	52 47 49	3005
	Jupiter E.	70 40 23	3038	69 10 57	3047	67 41 43	3055	66 12 38	3062
	Mars E.	94 7 32	3218	92 41 44	3226	91 16 6	3235	89 50 38	3242
	Venus E.	103 4 18	3432	101 42 38	3442	100 21 9	3450	98 59 49	3459
	Sun E.	131 48 26	3344	130 25 6	3353	129 1 56	3362	127 38 56	3370
16	Fomalhaut W.	51 21 19	3376	52 44 3	3368	54 6 56	3360	55 29 58	3354
	α Pegasi W.	39 0 10	4173	40 9 2	4109	41 18 55	4052	42 29 43	4001
	Aldebaran E.	45 18 49	3039	43 49 25	3045	42 20 8	3051	40 50 58	3056
	Jupiter E.	58 49 25	3096	57 21 10	3101	55 53 2	3105	54 24 59	3111
	Mars E.	82 45 30	3277	81 20 52	3282	79 56 20	3288	78 31 55	3293
	Venus E.	92 15 27	3496	90 54 58	3503	89 34 37	3508	88 14 21	3513
	Sun E.	120 46 6	3405	119 23 55	3411	118 1 51	3416	116 39 52	3421
17	Fomalhaut W.	62 26 47	3328	63 50 26	3323	65 14 11	3319	66 38 1	3314
	α Pegasi W.	48 35 3	3806	49 49 59	3777	51 5 25	3749	52 21 20	3724
	Jupiter E.	47 6 5	3122	45 38 30	3130	44 10 57	3123	42 43 26	3133
	Mars E.	71 31 2	3311	70 7 3	3313	68 43 6	3314	67 19 11	3315
	Pollux E.	77 45 43	3094	76 17 26	3096	74 49 12	3099	73 21 1	3100
	Venus E.	81 34 19	3532	80 14 30	3534	78 54 44	3536	77 35 0	3537
	Sun E.	109 51 16	3439	108 29 44	3441	107 8 14	3443	105 46 46	3445
18	Fomalhaut W.	73 38 27	3292	75 2 48	3287	76 27 14	3282	77 51 47	3277
	α Pegasi W.	58 47 8	3619	60 5 22	3600	61 23 56	3583	62 42 49	3567
	Mars E.	60 19 44	3313	58 55 48	3312	57 31 50	3309	56 7 49	3306
	Pollux E.	66 0 23	3102	64 32 16	3101	63 4 7	3100	61 35 57	3097
	Venus E.	70 56 30	3536	69 36 46	3535	68 17 0	3532	66 57 11	3529



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup>	P.L. of diff.	XVIII <sup>h</sup>	P.L. of diff.	XXI <sup>h</sup>	P.L. of diff.
11	Saturn W.	64 30 46	2666	66 8 11	2677	67 45 21	2689	69 22 15	2701
	α Arietis E.	70 18 20	2844	68 44 49	2859	67 11 37	2875	65 38 46	2891
	Aldebaran E.	101 6 37	2675	99 29 24	2687	97 52 27	2699	96 15 45	2711
	Jupiter E.	113 53 29	2733	112 17 33	2744	110 41 51	2756	109 6 25	2767
12	Saturn W.	77 22 51	2759	78 58 12	2772	80 33 17	2784	82 8 6	2795
	α Aquilæ W.	50 20 47	3945	51 33 21	3905	52 46 35	3870	54 0 25	3839
	α Arietis E.	57 59 53	2981	56 29 16	3000	54 59 3	3021	53 29 16	3042
	Aldebaran E.	88 16 10	2769	86 41 2	2781	85 6 9	2792	83 31 31	2804
	Jupiter E.	101 13 6	2826	99 39 12	2838	98 5 34	2849	96 32 10	2862
13	Saturn W.	89 58 28	2852	91 31 48	2863	93 4 54	2874	94 37 46	2885
	α Aquilæ W.	60 16 26	3731	61 32 40	3717	62 49 9	3704	64 5 52	3693
	α Arietis E.	46 7 12	3163	44 40 18	3191	43 13 58	3221	41 48 13	3253
	Aldebaran E.	75 42 9	2861	74 9 0	2873	72 36 6	2884	71 3 26	2894
	Jupiter E.	88 48 57	2919	87 17 2	2930	85 45 21	2940	84 13 53	2952
14	Saturn W.	102 18 45	2935	103 50 19	2945	105 21 40	2954	106 52 51	2963
	α Aquilæ W.	70 31 44	3661	71 49 13	3659	73 6 44	3656	74 24 18	3654
	α Arietis E.	34 49 46	3454	33 28 30	3506	32 8 13	3565	30 49 0	3630
	Aldebaran E.	63 23 25	2945	61 52 3	2954	60 20 53	2963	58 49 54	2973
	Jupiter E.	76 39 55	3002	75 9 44	3012	73 39 46	3021	72 9 59	3030
	Mars E.	99 52 35	3180	98 26 2	3190	96 59 41	3199	95 33 31	3209
15	α Aquilæ W.	80 52 16	3658	82 9 48	3661	83 27 17	3663	84 44 44	3666
	Fomalhaut W.	45 52 14	3418	47 14 10	3405	48 36 21	3394	49 58 44	3384
	Aldebaran E.	51 17 43	3013	49 47 46	3021	48 17 59	3027	46 48 20	3034
	Jupiter E.	64 43 42	3069	63 14 55	3077	61 46 17	3083	60 17 47	3090
	Mars E.	88 25 19	3250	87 0 9	3258	85 35 8	3264	84 10 15	3271
	Venus E.	97 38 39	3468	96 17 39	3475	94 56 47	3482	93 36 3	3489
	Sun E.	126 16 5	3378	124 53 23	3386	123 30 50	3392	122 8 24	3399
16	Fomalhaut W.	56 53 7	3348	58 16 23	3343	59 39 45	3338	61 3 13	3332
	α Pegasi W.	43 41 22	3955	44 53 47	3913	46 6 54	3874	47 20 40	3838
	Aldebaran E.	39 21 55	3060	37 52 57	3064	36 24 4	3069	34 55 17	3073
	Jupiter E.	52 57 3	3115	51 29 12	3119	50 1 26	3122	48 33 43	3126
	Mars E.	77 7 35	3297	75 43 20	3301	74 19 10	3305	72 55 4	3308
	Venus E.	86 54 11	3518	85 34 7	3522	84 14 7	3525	82 54 11	3529
	Sun E.	115 17 59	3426	113 56 12	3430	112 34 30	3433	111 12 51	3437
17	Fomalhaut W.	68 1 56	3310	69 25 56	3306	70 50 1	3301	72 14 11	3296
	α Pegasi W.	53 37 42	3700	54 54 29	3678	56 11 40	3657	57 29 13	3637
	Jupiter E.	41 15 57	3134	39 48 29	3135	38 21 2	3134	36 53 34	3134
	Mars E.	65 55 17	3316	64 31 24	3316	63 7 31	3316	61 43 38	3315
	Pollux E.	71 52 52	3101	70 24 44	3102	68 56 37	3102	67 28 30	3102
	Venus E.	76 15 17	3539	74 55 36	3538	73 35 54	3538	72 16 12	3538
	Sun E.	104 25 20	3446	103 3 55	3446	101 42 30	3445	100 21 4	3445
18	Fomalhaut W.	79 16 25	3271	80 41 10	3266	82 6 1	3261	83 30 58	3254
	α Pegasi W.	64 2 0	3551	65 21 28	3536	66 41 12	3521	68 1 13	3506
	Mars E.	54 43 45	3302	53 19 36	3299	51 55 23	3294	50 31 5	3290
	Pollux E.	60 7 44	3096	58 39 29	3093	57 11 11	3091	55 42 50	3087
	Venus E.	65 37 19	3525	64 17 23	3521	62 57 22	3517	61 37 17	3512



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
18	SUN E.	98° 59' 38"	3443	97° 38' 10"	3441	96° 16' 40"	3439	94° 55' 7"	3437
19	Fomalhaut W.	84° 56' 30"	3249	86° 21' 14"	3242	87° 46' 34"	3236	89° 12' 0"	3229
	α Pegasi W.	69° 21' 30"	3492	70° 42' 3"	3479	72° 2' 50"	3465	73° 23' 53"	3452
	Mars E.	49° 6' 42"	3284	47° 42' 12"	3278	46° 17' 35"	3272	44° 52' 51"	3265
	Pollux E.	54° 14' 25"	3083	52° 45' 55"	3079	51° 17' 20"	3075	49° 48' 40"	3071
	Venus E.	60° 17' 6"	3506	58° 56' 49"	3500	57° 36' 25"	3494	56° 15' 54"	3486
	SUN E.	88° 6' 24"	3414	86° 44' 23"	3408	85° 22' 16"	3401	84° 0' 1"	3394
20	α Pegasi W.	80° 12' 48"	3388	81° 35' 18"	3376	82° 58' 2"	3363	84° 21' 1"	3351
	α Arietis W.	36° 35' 43"	3416	37° 57' 42"	3379	39° 20' 23"	3344	40° 43' 44"	3311
	Mars E.	37° 46' 55"	3223	36° 21' 13"	3214	34° 55' 20"	3203	33° 29' 14"	3193
	Pollux E.	42° 23' 54"	3046	40° 54' 38"	3040	39° 25' 15"	3035	37° 55' 45"	3030
	Venus E.	49° 31' 6"	3443	48° 9' 38"	3432	46° 47' 58"	3422	45° 26' 7"	3411
	SUN E.	77° 6' 36"	3352	75° 43' 25"	3343	74° 20' 3"	3332	72° 56' 28"	3322
21	α Pegasi W.	91° 19' 20"	3292	92° 43' 40"	3281	94° 8' 14"	3270	95° 33' 1"	3259
	α Arietis W.	47° 49' 22"	3171	49° 16' 6"	3146	50° 43' 20"	3122	52° 11' 3"	3099
	Pollux E.	30° 26' 51"	3011	28° 56' 52"	3010	27° 26' 52"	3011	25° 56' 53"	3015
	Venus E.	38° 33' 32"	3350	37° 10' 18"	3337	35° 46' 49"	3322	34° 23' 3"	3308
	SUN E.	65° 55' 21"	3262	64° 30' 25"	3249	63° 5' 14"	3235	61° 39' 46"	3222
22	α Arietis W.	59° 36' 29"	2991	61° 6' 53"	2970	62° 37' 44"	2950	64° 9' 0"	2930
	Aldebaran W.	26° 59' 1"	2805	28° 33' 23"	2789	30° 8' 5"	2773	31° 43' 8"	2757
	Venus E.	27° 20' 2"	3233	25° 54' 32"	3218	24° 28' 44"	3202	23° 2' 37"	3187
	SUN E.	54° 28' 19"	3149	53° 1' 9"	3134	51° 33' 41"	3119	50° 5' 54"	3103
23	α Arietis W.	71° 51' 35"	2834	73° 25' 19"	2815	74° 59' 28"	2797	76° 34' 0"	2779
	Aldebaran W.	39° 43' 41"	2677	41° 20' 52"	2661	42° 58' 24"	2645	44° 36' 18"	2628
	Jupiter W.	25° 7' 46"	2730	26° 43' 46"	2713	28° 20' 9"	2696	29° 56' 54"	2679
	SUN E.	42° 42' 12"	3024	41° 12' 29"	3009	39° 42' 27"	2993	38° 12' 6"	2977
24	Aldebaran W.	52° 51' 19"	2548	54° 31' 26"	2533	56° 11' 53"	2517	57° 52' 43"	2502
	Jupiter W.	38° 6' 20"	2596	39° 45' 20"	2580	41° 24' 43"	2564	43° 4' 27"	2548
	SUN E.	30° 35' 32"	2905	29° 3' 19"	2892	27° 30' 49"	2880	25° 58' 4"	2868
28	SUN W.	22° 2' 7"	2548	23° 42' 13"	2537	25° 22' 35"	2528	27° 3' 10"	2520
	Antares E.	71° 59' 55"	2235	70° 12' 20"	2233	68° 24' 42"	2231	66° 37' 0"	2229
	Saturn E.	85° 21' 58"	2192	83° 33' 19"	2188	81° 44' 33"	2184	79° 55' 42"	2182
29	SUN W.	35° 28' 19"	2496	37° 9' 38"	2494	38° 51' 0"	2493	40° 32' 23"	2492
	Antares E.	57° 38' 11"	2230	55° 50' 28"	2233	54° 2' 50"	2236	52° 15' 15"	2240
	Saturn E.	70° 50' 36"	2174	69° 1' 30"	2174	67° 12' 23"	2174	65° 23' 17"	2175
	α Aquilæ E.	103° 45' 44"	2846	102° 12' 16"	2837	100° 38' 36"	2829	99° 4' 46"	2823
30	SUN W.	48° 59' 15"	2498	50° 40' 31"	2501	52° 21' 43"	2503	54° 2' 52"	2507
	Antares E.	43° 19' 18"	2273	41° 32' 39"	2283	39° 46' 14"	2294	38° 0' 5"	2307
	Saturn E.	56° 18' 18"	2186	54° 29' 29"	2188	52° 40' 44"	2192	50° 52' 5"	2196
	α Aquilæ E.	91° 14' 24"	2818	89° 40' 19"	2821	88° 6' 18"	2826	86° 32' 24"	2833
31	SUN W.	62° 27' 5"	2531	64° 7' 35"	2537	65° 47' 57"	2543	67° 28' 10"	2549
	Spica W.	19° 22' 25"	2520	21° 3' 11"	2480	22° 44' 53"	2450	24° 27' 17"	2437
	Antares E.	29° 14' 57"	2403	27° 31' 26"	2433	25° 48' 38"	2468	24° 6' 39"	2510
	Saturn E.	41° 50' 30"	2221	40° 2' 34"	2227	38° 14' 46"	2233	36° 27' 8"	2239
	α Aquilæ E.	78° 45' 34"	2886	77° 12' 57"	2901	75° 40' 40"	2918	74° 8' 44"	2937



**MEAN TIME.**  
**LUNAR DISTANCES.**

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
18	SUN E.	1° 33' 32" 3433		92° 11' 52" 3429		90° 50' 8" 3424		89° 28' 19" 3419	
19	Fomalhaut W.	90 37 35 3222		92 3 18 3215		93 29 9 3208		94 55 8 3200	
	α Pegasi W.	74 45 11 3439		76 6 44 3426		77 28 31 3414		78 50 32 3401	
	Mars E.	43 27 58 3258		42 2 57 3249		40 37 46 3241		39 12 26 3232	
	Pollux E.	48 19 55 3066		46 51 4 3061		45 22 7 3056		43 53 4 3051	
	Venus E.	54 55 14 3479		53 34 26 3471		52 13 29 3462		50 52 23 3453	
	SUN E.	82 37 38 3387		81 15 7 3379		79 52 26 3371		78 29 36 3362	
20	α Pegasi W.	85 44 13 3339		87 7 39 3327		88 31 19 3316		89 55 12 3303	
	α Arietis W.	42 7 43 3280		43 32 18 3251		44 57 27 3223		46 23 9 3197	
	Mars E.	32 2 56 3182		30 36 25 3170		29 9 40 3158		27 42 41 3146	
	Pollux E.	36 26 9 3025		34 56 27 3021		33 26 40 3016		31 56 47 3013	
	Venus E.	44 4 3 3400		42 41 46 3388		41 19 16 3375		39 56 31 3363	
	SUN E.	71 32 42 3310		70 8 42 3299		68 44 29 3287		67 20 2 3275	
21	α Pegasi W.	96 58 1 3248		98 23 13 3238		99 48 37 3228		101 14 13 3218	
	α Arietis W.	53 39 14 3077		55 7 52 3054		56 36 58 3033		58 6 30 3011	
	Pollux E.	24 26 59 3021		22 57 12 3031		21 27 38 3047		19 58 23 3069	
	Venus E.	32 59 1 3294		31 34 42 3280		30 10 7 3264		28 45 13 3249	
	SUN E.	60 14 3 3208		58 48 3 3194		57 21 46 3179		55 55 12 3163	
22	α Arietis W.	65 40 41 2909		67 12 48 2890		68 45 19 2871		70 18 15 2852	
	Aldebaran W.	33 18 32 2741		34 54 17 2725		36 30 24 2710		38 6 51 2693	
	Venus E.	21 36 12 3170		20 9 27 3155		18 42 24 3138		17 15 1 3123	
	SUN E.	48 37 48 3087		47 9 23 3072		45 40 39 3056		44 11 35 3040	
23	α Arietis W.	78 8 56 2761		79 44 15 2744		81 19 57 2726		82 56 2 2710	
	Aldebaran W.	46 14 35 2612		47 53 13 2596		49 32 13 2580		51 11 35 2564	
	Jupiter W.	31 34 2 2662		33 11 33 2645		34 49 27 2629		36 27 42 2612	
	SUN E.	36 41 25 2962		35 10 25 2947		33 39 6 2932		32 7 28 2918	
24	Aldebaran W.	59 33 54 2486		61 15 27 2472		62 57 20 2456		64 39 35 2441	
	Jupiter W.	44 44 33 2532		46 25 2 2517		48 5 51 2502		49 47 2 2487	
	SUN E.	24 25 4 2858		22 51 51 2849		21 18 27 2842		19 44 54 2839	
28	SUN W.	28 43 56 2513		30 24 51 2507		32 5 55 2503		33 47 4 2499	
	Antares E.	64 49 15 2228		63 1 29 2227		61 13 42 2228		59 25 56 2229	
	Saturn E.	78 6 47 2179		76 17 48 2177		74 28 46 2176		72 39 42 2175	
29	SUN W.	42 13 47 2492		43 55 11 2493		45 36 34 2494		47 17 56 2496	
	Antares E.	50 27 47 2245		48 40 26 2250		46 53 13 2257		45 6 10 2264	
	Saturn E.	63 34 12 2176		61 45 9 2178		59 56 9 2180		58 7 11 2183	
	α Aquilæ E.	97 30 48 2819		95 56 45 2817		94 22 39 2816		92 48 31 2816	
30	SUN W.	55 43 55 2512		57 24 52 2516		59 5 43 2521		60 46 27 2525	
	Antares E.	36 14 15 2321		34 28 46 2338		32 43 41 2357		30 59 4 2378	
	Saturn E.	49 3 32 2201		47 15 6 2205		45 26 46 2210		43 38 34 2216	
	α Aquilæ E.	84 58 39 2840		83 25 3 2849		81 51 39 2860		80 18 29 2872	
31	SUN W.	69 8 15 2556		70 48 10 2563		72 27 56 2569		74 7 33 2577	
	Spica W.	26 10 14 2410		27 53 34 2398		29 37 12 2389		31 21 3 2383	
	Antares E.	22 25 39 2561		20 45 51 2625		19 7 30 2707		17 30 59 2813	
	Saturn E.	34 39 39 2246		32 52 20 2253		31 5 12 2260		29 18 13 2268	
	α Aquilæ E.	72 37 12 2957		71 6 5 2979		69 35 26 3003		68 5 17 3029	



Day of the Month.	AIRY'S Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1°56726	0°96449	0°17062	1°44557	84°130	15 17 55°06
2	1°57008	0°97471	0°17143	1°44516	83°541	15 13 59°15
3	1°57284	0°98488	0°17223	1°44475	82°952	15 10 3°24
4	1°57554	0°99501	0°17303	1°44434	82°361	15 6 7°33
5	1°57819	1°00510	0°17383	1°44392	81°770	15 2 11°42
6	1°58078	1°01515	0°17462	1°44350	81°178	14 58 15°51
7	1°58332	1°02514	0°17539	1°44309	80°587	14 54 19°60
8	1°58579	1°03505	0°17614	1°44267	79°997	14 50 23°70
9	1°58822	1°04490	0°17689	1°44225	79°407	14 46 27°79
10	1°59059	1°05470	0°17763	1°44183	78°817	14 42 31°88
11	1°59290	1°06442	0°17837	1°44142	78°227	14 38 35°97
12	1°59516	1°07407	0°17910	1°44100	77°637	14 34 40°06
13	1°59736	1°08365	0°17982	1°44059	77°049	14 30 44°15
14	1°59951	1°09315	0°18052	1°44018	76°461	14 26 48°25
15	1°60160	1°10258	0°18121	1°43977	75°876	14 22 52°34
16	1°60363	1°11191	0°18189	1°43936	75°293	14 18 56°43
17	1°60561	1°12116	0°18257	1°43895	74°711	14 15 0°52
18	1°60754	1°13035	0°18324	1°43854	74°129	14 11 4°61
19	1°60941	1°13945	0°18391	1°43814	73°548	14 7 8°70
20	1°61123	1°14847	0°18457	1°43774	72°967	14 3 12°79
21	1°61300	1°15739	0°18521	1°43735	72°389	13 59 16°88
22	1°61471	1°16623	0°18585	1°43696	71°812	13 55 20°97
23	1°61637	1°17499	0°18648	1°43658	71°238	13 51 25°07
24	1°61797	1°18365	0°18710	1°43620	70°668	13 47 29°16
25	1°61951	1°19222	0°18772	1°43582	70°099	13 43 33°25
26	1°62101	1°20072	0°18833	1°43545	69°531	13 39 37°35
27	1°62246	1°20912	0°18893	1°43509	68°966	13 35 41°44
28	1°62384	1°21742	0°18952	1°43473	68°405	13 31 45°53
29	1°62517	1°22564	0°19010	1°43437	67°848	13 27 49°62
30	1°62644	1°23377	0°19067	1°43402	67°293	13 23 53°71
31	1°62767	1°24181	0°19124	1°43368	66°740	13 19 57°80
32	1°62885	1°24976	0°19181	1°43335	66°189	13 16 1°89



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .78349. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	+1 <sup>h</sup> .0763	—1 <sup>h</sup> .1983	+9 <sup>h</sup> .4490	+0 <sup>h</sup> .4621	2404276	131	212	.5804
2	1 <sup>h</sup> .0849	1 <sup>h</sup> .1922	9 <sup>h</sup> .4533	0 <sup>h</sup> .4581	2404277	132	213	.5832
3	1 <sup>h</sup> .0933	1 <sup>h</sup> .1859	9 <sup>h</sup> .4575	0 <sup>h</sup> .4541	2404278	133	214	.5859
4	+1 <sup>h</sup> .1014	—1 <sup>h</sup> .1794	+9 <sup>h</sup> .4617	+0 <sup>h</sup> .4501	2404279	134	215	.5887
5	1 <sup>h</sup> .1093	1 <sup>h</sup> .1727	9 <sup>h</sup> .4657	0 <sup>h</sup> .4459	2404280	135	216	.5914
6	1 <sup>h</sup> .1169	1 <sup>h</sup> .1657	9 <sup>h</sup> .4697	0 <sup>h</sup> .4418	2404281	136	217	.5941
7	+1 <sup>h</sup> .1242	—1 <sup>h</sup> .1585	+9 <sup>h</sup> .4736	+0 <sup>h</sup> .4376	2404282	137	218	.5969
8	1 <sup>h</sup> .1313	1 <sup>h</sup> .1511	9 <sup>h</sup> .4774	0 <sup>h</sup> .4333	2404283	138	219	.5996
9	1 <sup>h</sup> .1382	1 <sup>h</sup> .1434	9 <sup>h</sup> .4811	0 <sup>h</sup> .4290	2404284	139	220	.6023
10	+1 <sup>h</sup> .1448	—1 <sup>h</sup> .1354	+9 <sup>h</sup> .4848	+0 <sup>h</sup> .4247	2404285	140	221	.6051
11	1 <sup>h</sup> .1512	1 <sup>h</sup> .1271	9 <sup>h</sup> .4884	0 <sup>h</sup> .4204	2404286	141	222	.6078
12	1 <sup>h</sup> .1574	1 <sup>h</sup> .1186	9 <sup>h</sup> .4919	0 <sup>h</sup> .4160	2404287	142	223	.6106
13	+1 <sup>h</sup> .1634	—1 <sup>h</sup> .1098	+9 <sup>h</sup> .4954	+0 <sup>h</sup> .4116	2404288	143	224	.6133
14	1 <sup>h</sup> .1692	1 <sup>h</sup> .1006	9 <sup>h</sup> .4988	0 <sup>h</sup> .4071	2404289	144	225	.6160
15	1 <sup>h</sup> .1748	1 <sup>h</sup> .0912	9 <sup>h</sup> .5022	0 <sup>h</sup> .4027	2404290	145	226	.6188
16	+1 <sup>h</sup> .1803	—1 <sup>h</sup> .0814	+9 <sup>h</sup> .5054	+0 <sup>h</sup> .3982	2404291	146	227	.6215
17	1 <sup>h</sup> .1855	1 <sup>h</sup> .0712	9 <sup>h</sup> .5086	0 <sup>h</sup> .3937	2404292	147	228	.6242
18	1 <sup>h</sup> .1906	1 <sup>h</sup> .0607	9 <sup>h</sup> .5118	0 <sup>h</sup> .3892	2404293	148	229	.6270
19	+1 <sup>h</sup> .1954	—1 <sup>h</sup> .0497	+9 <sup>h</sup> .5149	+0 <sup>h</sup> .3847	2404294	149	230	.6297
20	1 <sup>h</sup> .2001	1 <sup>h</sup> .0384	9 <sup>h</sup> .5180	0 <sup>h</sup> .3802	2404295	150	231	.6325
21	1 <sup>h</sup> .2047	1 <sup>h</sup> .0266	9 <sup>h</sup> .5209	0 <sup>h</sup> .3756	2404296	151	232	.6352
22	+1 <sup>h</sup> .2090	—1 <sup>h</sup> .0144	+9 <sup>h</sup> .5239	+0 <sup>h</sup> .3711	2404297	152	233	.6379
23	1 <sup>h</sup> .2132	1 <sup>h</sup> .0017	9 <sup>h</sup> .5267	0 <sup>h</sup> .3666	2404298	153	234	.6407
24	1 <sup>h</sup> .2173	0 <sup>h</sup> .9884	9 <sup>h</sup> .5296	0 <sup>h</sup> .3621	2404299	154	235	.6434
25	+1 <sup>h</sup> .2212	—0 <sup>h</sup> .9746	+9 <sup>h</sup> .5324	+0 <sup>h</sup> .3576	2404300	155	236	.6461
26	1 <sup>h</sup> .2249	0 <sup>h</sup> .9602	9 <sup>h</sup> .5351	0 <sup>h</sup> .3532	2404301	156	237	.6489
27	1 <sup>h</sup> .2285	0 <sup>h</sup> .9452	9 <sup>h</sup> .5378	0 <sup>h</sup> .3487	2404302	157	238	.6516
28	+1 <sup>h</sup> .2319	—0 <sup>h</sup> .9295	+9 <sup>h</sup> .5404	+0 <sup>h</sup> .3443	2404303	158	239	.6544
29	1 <sup>h</sup> .2352	0 <sup>h</sup> .9131	9 <sup>h</sup> .5430	0 <sup>h</sup> .3400	2404304	159	240	.6571
30	1 <sup>h</sup> .2383	0 <sup>h</sup> .8960	9 <sup>h</sup> .5456	0 <sup>h</sup> .3356	2404305	160	241	.6598
31	1 <sup>h</sup> .2413	0 <sup>h</sup> .8779	9 <sup>h</sup> .5481	0 <sup>h</sup> .3314	2404306	161	242	.6626
32	+1 <sup>h</sup> .2442	—0 <sup>h</sup> .8590	+9 <sup>h</sup> .5506	+0 <sup>h</sup> .3271	2404307	162	243	.6653

\* Add .0026 if Fraction be required for the time *t*, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Thur.	1	10 41 41.22	9.073	N. 8 16 21.3	54.49	1 4.40	0 6.10	0.781
Frid.	2	10 45 18.82	9.060	7 54 29.7	54.81	1 4.36	0 24.99	0.794
Sat.	3	10 48 56.11	9.048	7 32 30.6	55.12	1 4.32	0 44.19	0.806
Sun.	4	10 52 33.13	9.037	7 10 24.1	55.41	1 4.28	1 3.68	0.817
Mon.	5	10 56 9.89	9.027	6 48 10.8	55.69	1 4.25	1 23.42	0.827
Tues.	6	10 59 46.41	9.017	6 25 50.9	55.96	1 4.22	1 43.40	0.837
Wed.	7	11 3 22.70	8.908	6 3 24.6	56.22	1 4.19	2 3.61	0.846
Thur.	8	11 6 58.79	8.900	5 40 52.5	56.46	1 4.16	2 24.02	0.854
Frid.	9	11 10 34.71	8.993	5 18 14.7	56.69	1 4.14	2 44.60	0.861
Sat.	10	11 14 10.47	8.987	4 55 31.5	56.90	1 4.12	3 5.33	0.866
Sun.	11	11 17 46.11	8.982	4 32 43.4	57.11	1 4.10	3 26.19	0.871
Mon.	12	11 21 21.63	8.978	4 9 50.4	57.30	1 4.08	3 47.16	0.876
Tues.	13	11 24 57.07	8.975	3 46 53.0	57.48	1 4.07	4 8.22	0.879
Wed.	14	11 28 32.44	8.973	3 23 51.5	57.64	1 4.06	4 29.34	0.881
Thur.	15	11 32 7.78	8.972	3 0 46.2	57.79	1 4.05	4 50.50	0.882
Frid.	16	11 35 43.09	8.972	2 37 37.4	57.93	1 4.05	5 11.68	0.883
Sat.	17	11 39 18.41	8.972	2 14 25.4	58.06	1 4.05	5 32.86	0.882
Sun.	18	11 42 53.75	8.973	1 51 10.6	58.17	1 4.05	5 54.01	0.881
Mon.	19	11 46 29.13	8.975	1 27 53.2	58.27	1 4.05	6 15.12	0.878
Tues.	20	11 50 4.57	8.979	1 4 33.7	58.35	1 4.06	6 36.16	0.875
Wed.	21	11 53 40.10	8.983	0 41 12.4	58.42	1 4.07	6 57.13	0.872
Thur.	22	11 57 15.73	8.987	N. 0 17 49.5	58.48	1 4.08	7 18.01	0.868
Frid.	23	12 0 51.46	8.991	S. 0 5 34.4	58.52	1 4.10	7 38.78	0.863
Sat.	24	12 4 27.32	8.997	0 28 59.1	58.54	1 4.12	7 59.41	0.856
Sun.	25	12 8 3.34	9.004	0 52 24.2	58.55	1 4.14	8 19.89	0.850
Mon.	26	12 11 39.52	9.011	1 15 49.4	58.54	1 4.17	8 40.21	0.843
Tues.	27	12 15 15.88	9.019	1 39 14.3	58.52	1 4.20	9 0.34	0.835
Wed.	28	12 18 52.45	9.028	2 2 38.5	58.49	1 4.23	9 20.27	0.826
Thur.	29	12 22 29.24	9.038	2 26 1.6	58.43	1 4.27	9 39.98	0.816
Frid.	30	12 26 6.26	9.048	2 49 23.3	58.36	1 4.31	9 59.46	0.806
Sat.	31	12 29 43.53	9.059	S. 3 12 43.1	58.28	1 4.35	10 18.69	0.795

\* Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the *Sidereal Time*.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		h m s	° ' "	' "	m s	h m s
Thur.	1	10 41 41.23	N. 8 16 21.3	15 53.6	0 6.10	10 41 47.33
Frid.	2	10 45 18.88	7 54 29.4	15 53.8	0 25.00	10 45 43.88
Sat.	3	10 48 56.22	7 32 29.9	15 54.0	0 44.21	10 49 40.43
Sun.	4	10 52 33.29	7 10 23.1	15 54.3	1 3.70	10 53 36.99
Mon.	5	10 56 10.10	6 48 9.5	15 54.5	1 23.44	10 57 33.54
Tues.	6	10 59 46.67	6 25 49.3	15 54.8	1 43.42	11 1 30.09
Wed.	7	11 3 23.01	6 3 22.7	15 55.0	2 3.64	11 5 26.65
Thur.	8	11 6 59.15	5 40 50.2	15 55.3	2 24.05	11 9 23.20
Frid.	9	11 10 35.12	5 18 12.1	15 55.5	2 44.63	11 13 19.75
Sat.	10	11 14 10.93	4 55 28.6	15 55.8	3 5.37	11 17 16.30
Sun.	11	11 17 46.62	4 32 40.1	15 56.0	3 26.24	11 21 12.86
Mon.	12	11 21 22.19	4 9 46.8	15 56.3	3 47.22	11 25 9.41
Tues.	13	11 24 57.68	3 46 49.1	15 56.5	4 8.29	11 29 5.97
Wed.	14	11 28 33.11	3 23 47.2	15 56.8	4 29.41	11 33 2.52
Thur.	15	11 32 8.50	3 0 41.5	15 57.0	4 50.57	11 36 59.07
Frid.	16	11 35 43.87	2 37 32.4	15 57.3	5 11.76	11 40 55.63
Sat.	17	11 39 19.24	2 14 20.0	15 57.6	5 32.94	11 44 52.18
Sun.	18	11 42 54.63	1 51 4.8	15 57.8	5 54.10	11 48 48.73
Mon.	19	11 46 30.06	1 27 47.2	15 58.1	6 15.22	11 52 45.28
Tues.	20	11 50 5.56	1 4 27.3	15 58.3	6 36.27	11 56 41.83
Wed.	21	11 53 41.14	0 41 5.6	15 58.6	6 57.24	12 0 38.38
Thur.	22	11 57 16.82	N. 0 17 42.4	15 58.9	7 18.12	12 4 34.94
Frid.	23	12 0 52.60	S. 0 5 41.9	15 59.1	7 38.89	12 8 31.49
Sat.	24	12 4 28.52	0 29 6.9	15 59.4	7 59.52	12 12 28.04
Sun.	25	12 8 4.59	0 52 32.4	15 59.7	8 20.01	12 16 24.60
Mon.	26	12 11 40.82	1 15 57.9	15 59.9	8 40.33	12 20 21.15
Tues.	27	12 15 17.24	1 39 23.1	16 0.2	9 0.47	12 24 17.71
Wed.	28	12 18 53.86	2 2 47.6	16 0.5	9 20.40	12 28 14.26
Thur.	29	12 22 30.70	2 26 11.0	16 0.8	9 40.11	12 32 10.81
Frid.	30	12 26 7.77	2 49 33.0	16 1.1	9 59.59	12 36 7.36
Sat.	31	12 29 45.09	S. 3 12 53.2	16 1.3	10 18.82	12 40 3.91

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	158° 48' 32.8"	N. 0° 39'	0.0037446	16° 13.4'	16° 10.3'	59° 26.5'	59° 15.0'
2	159 46 41.1	0° 30'	0.0036359	16 6.9	16 3.2	59 2.4	58 49.0
3	160 44 50.8	0° 19'	0.0035261	15 59.4	15 55.4	58 35.0	58 20.5
4	161 43 2.0	N. 0° 06'	0.0034153	15 51.4	15 47.3	58 5.7	57 50.7
5	162 41 14.6	S. 0° 07'	0.0033037	15 43.2	15 39.1	57 35.6	57 20.5
6	163 39 28.7	0° 19'	0.0031915	15 34.9	15 30.8	57 5.3	56 50.2
7	164 37 44.3	0° 31'	0.0030788	15 26.7	15 22.6	56 35.1	56 20.2
8	165 36 1.5	0° 40'	0.0029658	15 18.6	15 14.6	56 5.4	55 50.9
9	166 34 20.5	0° 48'	0.0028524	15 10.7	15 7.0	55 36.7	55 23.0
10	167 32 41.3	0° 52'	0.0027386	15 3.4	15 0.0	55 9.9	54 57.5
11	168 31 3.9	0° 55'	0.0026245	14 56.9	14 54.1	54 46.1	54 35.7
12	169 29 28.4	0° 55'	0.0025100	14 51.6	14 49.5	54 26.6	54 19.0
13	170 27 55.0	0° 52'	0.0023953	14 47.9	14 46.8	54 13.0	54 8.8
14	171 26 23.7	0° 48'	0.0022802	14 46.1	14 46.0	54 6.5	54 6.3
15	172 24 54.5	0° 42'	0.0021647	14 46.6	14 47.9	54 8.4	54 12.9
16	173 23 27.4	0° 34'	0.0020488	14 49.8	14 52.3	54 19.8	54 29.2
17	174 22 2.6	0° 23'	0.0019323	14 55.6	14 59.5	54 41.1	54 55.6
18	175 20 40.0	S. 0° 12'	0.0018153	15 4.1	15 9.4	55 12.5	55 31.7
19	176 19 19.6	0° 00'	0.0016977	15 15.2	15 21.5	55 53.0	56 16.3
20	177 18 1.4	N. 0° 12'	0.0015794	15 28.3	15 35.5	56 41.3	57 7.5
21	178 16 45.4	0° 24'	0.0014602	15 42.9	15 50.4	57 34.6	58 1.9
22	179 15 31.6	0° 36'	0.0013401	15 57.8	16 5.0	58 29.1	58 55.4
23	180 14 19.9	0° 45'	0.0012191	16 11.7	16 17.9	59 20.3	59 43.0
24	181 13 10.2	0° 53'	0.0010971	16 23.4	16 28.0	60 3.0	60 19.8
25	182 12 2.7	0° 57'	0.0009740	16 31.6	16 34.1	60 32.9	60 42.0
26	183 10 57.1	0° 57'	0.0008498	16 35.4	16 35.6	60 46.9	60 47.5
27	184 9 53.5	0° 54'	0.0007247	16 34.6	16 32.6	60 44.0	60 36.6
28	185 8 51.8	0° 48'	0.0005987	16 29.6	16 25.8	60 25.8	60 11.9
29	186 7 52.0	0° 38'	0.0004719	16 21.3	16 16.3	59 55.4	59 36.9
30	187 6 53.9	0° 26'	0.0003445	16 10.9	16 5.2	59 17.0	58 56.1
31	188 5 57.6	N. 0° 13'	0.0002168	15 59.3	15 53.4	58 34.6	58 13.0



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.								
		Longitude.				Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
Thur.	1	234 33 16.8	241 39 37.4	N.4 6 55.4	N.3 42 22.3	5.6	5 2.2		
Frid.	2	248 42 34.1	255 42 0.3	3 14 37.1	2 44 9.8	6.6	5 57.8		
Sat.	3	262 37 53.5	269 30 15.8	2 11 32.2	1 37 16.5	7.6	6 54.6		
Sun.	4	276 19 11.1	283 4 45.6	N.1 1 54.9	N.0 25 59.3	8.6	7 51.6		
Mon.	5	289 47 5.7	296 26 18.2	S.0 9 59.4	S.0 45 31.0	9.6	8 47.8		
Tues.	6	303 2 29.1	309 35 43.3	1 20 7.5	1 53 22.2	10.6	9 42.0		
Wed.	7	316 6 4.6	322 33 35.5	2 24 50.5	2 54 10.3	11.6	10 33.3		
Thur.	8	328 58 17.3	335 20 11.2	3 21 2.0	3 45 8.6	12.6	11 21.7		
Frid.	9	341 39 17.2	347 55 36.2	4 6 15.9	4 24 12.8	13.6	12 7.5		
Sat.	10	354 9 9.2	0 19 58.9	4 38 50.7	4 50 4.1	14.6	12 51.2		
Sun.	11	6 28 9.4	12 33 47.6	4 57 50.0	5 2 7.6	15.6	13 33.5		
Mon.	12	18 37 2.2	24 38 5.5	5 2 58.5	5 0 26.2	16.6	14 15.3		
Tues.	13	30 37 12.3	36 34 41.3	4 54 35.7	4 45 33.5	17.6	14 57.3		
Wed.	14	42 30 53.9	48 26 15.3	4 33 27.1	4 18 25.0	18.6	15 40.2		
Thur.	15	54 21 13.3	60 16 19.1	4 0 36.7	3 40 11.9	19.6	16 24.7		
Frid.	16	66 12 5.9	72 9 9.9	3 17 21.5	2 52 16.9	20.6	17 11.3		
Sat.	17	78 8 8.7	84 9 41.3	2 25 10.1	1 56 14.5	21.6	18 0.1		
Sun.	18	90 14 27.7	96 23 7.6	1 25 44.3	S.0 53 55.4	22.6	18 51.1		
Mon.	19	102 36 20.3	108 54 43.3	S.0 21 5.3	N.0 12 26.5	23.6	19 43.8		
Tues.	20	115 18 50.8	121 49 12.9	N.0 46 17.6	1 20 3.9	24.6	20 37.6		
Wed.	21	128 26 14.4	135 10 12.5	1 53 18.2	2 25 30.5	25.6	21 31.6		
Thur.	22	142 1 15.9	148 59 22.7	2 56 8.8	3 24 39.3	26.6	22 25.3		
Frid.	23	156 4 20.0	163 15 42.6	3 50 27.4	4 12 58.7	27.6	23 18.5		
Sat.	24	170 32 53.1	177 55 2.3	4 31 40.6	4 46 3.9	28.6	6		
Sun.	25	185 21 10.6	192 50 10.3	4 55 44.7	5 0 25.3	0.2	0 11.5		
Mon.	26	200 20 48.7	207 51 50.8	4 59 55.9	4 54 15.1	1.2	1 4.7		
Tues.	27	215 22 3.5	222 50 18.4	4 43 30.1	4 27 55.8	2.2	1 58.7		
Wed.	28	230 15 34.5	237 37 1.0	4 7 54.8	3 43 54.9	3.2	2 54.1		
Thur.	29	244 53 57.4	252 5 54.7	3 16 28.4	2 46 10.4	4.2	3 51.0		
Frid.	30	259 12 35.1	266 13 50.1	2 13 37.0	1 39 24.8	5.2	4 48.9		
Sat.	31	273 9 40.2	280 0 12.8	N.1 4 9.2	N.0 28 23.9	6.2	5 47.0		



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 1.</b>				<b>SATURDAY 3.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	15 32 54.71	S. 14 55 38.9	103.43	0	17 28 25.59	S. 21 3 41.0	46.78
1	15 35 15.90	15 5 56.6	102.46	1	17 30 52.56	21 8 17.6	45.42
2	15 37 37.25	15 16 8.4	101.48	2	17 33 19.58	21 12 46.0	44.06
3	15 39 58.74	15 26 14.4	100.50	3	17 35 46.65	21 17 6.3	42.71
4	15 42 20.39	15 36 14.5	99.50	4	17 38 13.77	21 21 18.5	41.35
5	15 44 42.18	15 46 8.5	98.49	5	17 40 40.93	21 25 22.5	39.98
6	15 47 4.12	15 55 56.4	97.48	6	17 43 8.13	21 29 18.3	38.62
7	15 49 26.22	16 5 38.3	96.46	7	17 45 35.37	21 33 5.9	37.24
8	15 51 48.46	16 15 13.9	95.42	8	17 48 2.63	21 36 45.2	35.87
9	15 54 10.85	16 24 43.3	94.37	9	17 50 29.92	21 40 16.3	34.49
10	15 56 33.39	16 34 6.3	93.31	10	17 52 57.24	21 43 39.1	33.12
11	15 58 56.08	16 43 23.0	92.24	11	17 55 24.57	21 46 53.7	31.73
12	16 1 18.91	16 52 33.2	91.16	12	17 57 51.91	21 49 59.9	30.35
13	16 3 41.89	17 1 36.9	90.07	13	18 0 19.26	21 52 57.9	28.97
14	16 6 5.02	17 10 34.1	88.97	14	18 3 46.61	21 55 47.5	27.58
15	16 8 28.29	17 19 24.6	87.86	15	18 5 13.97	21 58 28.8	26.19
16	16 10 51.70	17 28 8.4	86.74	16	18 7 41.32	22 1 1.8	24.81
17	16 13 15.26	17 36 45.5	85.62	17	18 10 8.65	22 3 26.5	23.42
18	16 15 38.96	17 45 15.8	84.48	18	18 12 35.97	22 5 42.8	22.03
19	16 18 2.79	17 53 39.3	83.33	19	18 15 3.27	22 7 50.8	20.63
20	16 20 26.77	18 1 55.8	82.17	20	18 17 30.55	22 9 50.4	19.24
21	16 22 50.88	18 10 5.4	81.01	21	18 19 57.80	22 11 41.7	17.86
22	16 25 15.12	18 18 7.9	79.83	22	18 22 25.02	22 13 24.7	16.46
23	16 27 39.50	S. 18 26 3.4	78.65	23	18 24 52.19	S. 22 14 59.2	15.06
<b>FRIDAY 2.</b>				<b>SUNDAY 4.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	16 30 4.01	S. 18 33 51.7	77.46	0	18 27 19.33	S. 22 16 25.4	13.67
1	16 32 28.65	18 41 32.9	76.27	1	18 29 46.42	22 17 43.3	12.29
2	16 34 53.44	18 49 6.9	75.07	2	18 32 13.45	22 18 52.9	10.90
3	16 37 18.32	18 56 33.7	73.85	3	18 34 40.43	22 19 54.1	9.51
4	16 39 43.34	19 3 53.1	72.63	4	18 37 7.34	22 20 47.0	8.13
5	16 42 8.47	19 11 5.2	71.40	5	18 39 34.18	22 21 31.6	6.74
6	16 44 33.73	19 18 9.9	70.16	6	18 42 0.95	22 22 7.9	5.36
7	16 46 59.11	19 25 7.1	68.91	7	18 44 27.65	22 22 35.9	3.98
8	16 49 24.60	19 31 56.8	67.66	8	18 46 54.26	22 22 55.6	2.59
9	16 51 50.20	19 38 39.0	66.40	9	18 49 20.79	22 23 7.0	1.22
10	16 54 15.91	19 45 13.6	65.13	10	18 51 47.22	22 23 10.2	0.16
11	16 56 41.73	19 51 40.6	63.86	11	18 54 13.56	22 23 5.1	1.54
12	16 59 7.65	19 57 59.9	62.58	12	18 56 39.79	22 22 51.7	2.91
13	17 1 33.67	20 4 11.5	61.29	13	18 59 5.92	22 22 30.2	4.27
14	17 3 59.79	20 10 15.4	60.00	14	19 1 31.94	22 22 0.5	5.63
15	17 6 26.00	20 16 11.5	58.70	15	19 3 57.84	22 21 22.6	6.99
16	17 8 52.30	20 21 59.8	57.39	16	19 6 23.62	22 20 36.6	8.34
17	17 11 18.69	20 27 40.2	56.08	17	19 8 49.28	22 19 42.5	9.70
18	17 13 45.16	20 33 12.8	54.77	18	19 11 14.81	22 18 40.2	11.05
19	17 16 11.72	20 38 37.5	53.45	19	19 13 40.21	22 17 29.9	12.38
20	17 18 38.35	20 43 54.2	52.12	20	19 16 5.46	22 16 11.6	13.72
21	17 21 5.06	20 49 2.9	50.78	21	19 18 30.58	22 14 45.2	15.06
22	17 23 31.84	20 54 3.6	49.45	22	19 20 55.55	22 13 10.8	16.39
23	17 25 58.68	20 58 56.3	48.12	23	19 23 20.36	22 11 28.5	17.72
24	17 28 25.59	S. 21 3 41.0	46.78	24	19 25 45.02	S. 22 9 38.2	19.04



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 5.</b>				<b>WEDNESDAY 7.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	19 25 45.02	S. 22 9 38.2	19.04	0	21 17 17.21	S. 18 19 25.9	73.64
1	19 28 9.52	22 7 40.0	10.36	1	21 19 30.37	18 12 1.3	74.55
2	19 30 33.86	22 5 33.9	11.67	2	21 21 43.26	18 4 31.3	75.45
3	19 32 58.02	22 3 20.0	12.97	3	21 23 55.86	17 56 55.9	76.35
4	19 35 22.02	22 0 58.3	14.27	4	21 26 8.19	17 49 15.1	77.23
5	19 37 45.84	21 58 28.8	15.56	5	21 28 20.23	17 41 29.1	78.10
6	19 40 9.47	21 55 51.6	16.84	6	21 30 32.00	17 33 37.9	78.96
7	19 42 32.92	21 53 6.7	18.12	7	21 32 43.48	17 25 41.6	79.81
8	19 44 56.19	21 50 14.1	19.40	8	21 34 54.68	17 17 40.2	80.65
9	19 47 19.26	21 47 13.9	20.67	9	21 37 5.60	17 9 33.8	81.48
10	19 49 42.14	21 44 6.1	21.92	10	21 39 16.24	17 1 22.4	82.31
11	19 52 4.82	21 40 50.8	23.17	11	21 41 26.60	16 53 6.1	83.12
12	19 54 27.29	21 37 28.1	24.41	12	21 43 36.67	16 44 45.0	83.91
13	19 56 49.56	21 33 57.9	25.66	13	21 45 46.47	16 36 19.2	84.69
14	19 59 11.62	21 30 20.2	26.89	14	21 47 55.99	16 27 48.7	85.47
15	20 1 33.46	21 26 35.2	28.12	15	21 50 5.24	16 19 13.5	86.24
16	20 3 55.09	21 22 42.8	29.33	16	21 52 14.21	16 10 33.8	87.00
17	20 6 16.50	21 18 43.2	30.54	17	21 54 22.90	16 1 49.5	87.75
18	20 8 37.68	21 14 36.3	31.74	18	21 56 31.31	15 53 0.8	88.48
19	20 10 58.63	21 10 22.3	32.93	19	21 58 39.44	15 44 7.8	89.20
20	20 13 19.36	21 6 1.1	34.12	20	22 0 47.31	15 35 10.4	89.92
21	20 15 39.86	21 1 32.9	35.29	21	22 2 54.90	15 26 8.7	90.63
22	20 18 0.12	20 56 57.6	36.47	22	22 5 2.21	15 17 2.8	91.32
23	20 20 20.14	S. 20 52 15.3	37.63	23	22 7 9.25	S. 15 7 52.9	92.00
<b>TUESDAY 6.</b>				<b>THURSDAY 8.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	20 22 39.92	S. 20 47 26.1	48.78	0	22 9 16.02	S. 14 58 38.8	92.68
1	20 24 59.46	20 42 30.0	49.92	1	22 11 22.52	14 49 20.7	93.34
2	20 27 18.76	20 37 27.1	51.05	2	22 13 28.76	14 39 58.7	93.99
3	20 29 37.80	20 32 17.4	52.17	3	22 15 34.73	14 30 32.8	94.64
4	20 31 56.60	20 27 1.0	53.29	4	22 17 40.43	14 21 3.0	95.28
5	20 34 15.15	20 21 37.9	54.41	5	22 19 45.87	14 11 29.5	95.89
6	20 36 33.44	20 16 8.1	55.51	6	22 21 51.04	14 1 52.3	96.50
7	20 38 51.47	20 10 31.8	56.59	7	22 23 55.96	13 52 11.5	97.10
8	20 41 9.25	20 4 49.0	57.67	8	22 26 0.61	13 42 27.1	97.69
9	20 43 26.76	19 58 59.8	58.74	9	22 28 5.01	13 32 39.2	98.27
10	20 45 44.01	19 53 4.1	59.81	10	22 30 9.15	13 22 47.8	98.85
11	20 48 1.00	19 47 2.1	60.85	11	22 32 13.04	13 12 53.0	99.41
12	20 50 17.72	19 40 53.9	61.89	12	22 34 16.67	13 2 54.9	99.96
13	20 52 34.18	19 34 39.4	62.92	13	22 36 20.05	12 52 53.5	100.50
14	20 54 50.36	19 28 18.8	63.95	14	22 38 23.18	12 42 48.9	101.03
15	20 57 6.28	19 21 52.0	64.97	15	22 40 26.06	12 32 41.2	101.54
16	20 59 21.93	19 15 19.2	65.97	16	22 42 28.70	12 22 30.4	102.06
17	21 1 37.30	19 8 40.3	66.96	17	22 44 31.09	12 12 16.5	102.57
18	21 3 52.40	19 1 55.6	67.94	18	22 46 33.24	12 1 59.6	103.05
19	21 6 7.23	18 55 5.0	68.92	19	22 48 35.15	11 51 39.9	103.53
20	21 8 21.78	18 48 8.6	69.88	20	22 50 36.82	11 41 17.3	104.00
21	21 10 36.06	18 41 6.4	70.84	21	22 52 38.25	11 30 51.9	104.46
22	21 12 50.05	18 33 58.5	71.78	22	22 54 39.46	11 20 23.8	104.90
23	21 15 3.77	18 26 45.0	72.72	23	22 56 40.43	11 9 53.1	105.34
24	21 17 17.21	S. 18 19 25.9	73.64	24	22 58 41.17	S. 10 59 19.7	105.77



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>FRIDAY 9.</b>				<b>SUNDAY 11.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	22 58 41.17	S. 10 59 19.7	105.77	0	0 31 36.73	S. 1 59 18.7	115.92
1	23 0 41.68	10 48 43.8	106.20	1	0 33 29.44	1 47 43.1	115.93
2	23 2 41.97	10 38 5.3	106.62	2	0 35 22.05	1 36 7.5	115.93
3	23 4 42.04	10 27 24.4	107.01	3	0 37 14.57	1 24 31.9	115.93
4	23 6 41.89	10 16 41.2	107.40	4	0 39 7.01	1 12 56.3	115.92
5	23 8 41.52	10 5 55.6	107.79	5	0 40 59.37	1 1 20.8	115.90
6	23 10 40.93	9 55 7.7	108.17	6	0 42 51.65	0 49 45.5	115.87
7	23 12 40.14	9 44 17.6	108.53	7	0 44 43.85	0 38 10.3	115.84
8	23 14 39.13	9 33 25.3	108.88	8	0 46 35.97	0 26 35.4	115.79
9	23 16 37.91	9 22 31.0	109.23	9	0 48 28.03	0 15 0.8	115.74
10	23 18 36.49	9 11 34.6	109.57	10	0 50 20.01	S. 0 3 26.5	115.69
11	23 20 34.86	9 0 36.2	109.90	11	0 52 11.93	N. 0 8 7.5	115.63
12	23 22 33.03	8 49 35.8	110.22	12	0 54 3.79	0 19 41.1	115.56
13	23 24 31.00	8 38 33.6	110.52	13	0 55 55.59	0 31 14.2	115.48
14	23 26 28.78	8 27 29.5	110.82	14	0 57 47.34	0 42 46.9	115.40
15	23 28 26.37	8 16 23.7	111.12	15	0 59 39.03	0 54 19.0	115.30
16	23 30 23.76	8 5 16.1	111.40	16	1 1 30.67	1 5 50.5	115.20
17	23 32 20.97	7 54 6.9	111.67	17	1 3 22.27	1 17 21.4	115.10
18	23 34 18.00	7 42 56.1	111.93	18	1 5 13.82	1 28 51.7	114.98
19	23 36 14.84	7 31 43.7	112.19	19	1 7 5.33	1 40 21.2	114.86
20	23 38 11.50	7 20 29.8	112.43	20	1 8 56.81	1 51 50.0	114.74
21	23 40 7.99	7 9 14.5	112.67	21	1 10 48.25	2 3 18.1	114.61
22	23 42 4.30	6 57 57.8	112.90	22	1 12 39.66	2 14 45.3	114.46
23	23 44 0.44	S. 6 46 39.7	113.12	23	1 14 31.04	N. 2 26 11.6	114.32
<b>SATURDAY 10.</b>				<b>MONDAY 12.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	23 45 56.41	S. 6 35 20.4	113.33	0	1 16 22.39	N. 2 37 37.1	114.17
1	23 47 52.22	6 23 59.8	113.53	1	1 18 13.72	2 49 1.6	114.01
2	23 49 47.86	6 12 38.1	113.72	2	1 20 5.03	3 0 25.2	113.84
3	23 51 43.34	6 1 15.2	113.91	3	1 21 56.33	3 11 47.7	113.66
4	23 53 38.67	5 49 51.2	114.08	4	1 23 47.61	3 23 9.1	113.48
5	23 55 33.84	5 38 26.2	114.26	5	1 25 38.88	3 34 29.5	113.30
6	23 57 28.86	5 27 0.1	114.42	6	1 27 30.15	3 45 48.7	113.10
7	23 59 23.74	5 15 33.2	114.56	7	1 29 21.41	3 57 6.7	112.90
8	0 1 18.47	5 4 5.4	114.71	8	1 31 12.67	4 8 23.5	112.69
9	0 3 13.05	4 52 36.7	114.85	9	1 33 3.93	4 19 39.0	112.48
10	0 5 7.50	4 41 7.2	114.98	10	1 34 55.19	4 30 53.3	112.27
11	0 7 1.81	4 29 37.0	115.09	11	1 36 46.47	4 42 6.2	112.03
12	0 8 55.99	4 18 6.1	115.20	12	1 38 37.75	4 53 17.6	111.79
13	0 10 50.03	4 6 34.6	115.30	13	1 40 29.05	5 4 27.7	111.56
14	0 12 43.95	3 55 2.5	115.40	14	1 42 20.36	5 15 36.3	111.31
15	0 14 37.74	3 43 29.8	115.49	15	1 44 11.69	5 26 43.4	111.06
16	0 16 31.41	3 31 56.6	115.57	16	1 46 3.05	5 37 49.0	110.81
17	0 18 24.96	3 20 22.9	115.64	17	1 47 54.43	5 48 53.1	110.54
18	0 20 18.39	3 8 48.9	115.70	18	1 49 45.83	5 59 55.5	110.27
19	0 22 11.71	2 57 14.5	115.76	19	1 51 37.27	6 10 56.3	109.99
20	0 24 4.93	2 45 39.8	115.81	20	1 53 28.74	6 21 55.4	109.70
21	0 25 58.03	2 34 4.8	115.85	21	1 55 20.25	6 32 52.7	109.41
22	0 27 51.03	2 22 29.6	115.88	22	1 57 11.80	6 43 48.3	109.12
23	0 29 43.93	2 10 54.2	115.91	23	1 59 3.39	6 54 42.1	108.81
24	0 31 36.73	S. 1 59 18.7	115.92	24	2 0 55.03	N. 7 5 34.0	108.50



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 13.</b>				<b>THURSDAY 15.</b>			
0	h m s 2 0 55.03	N. 7 5 34.0	108.50	0	h m s 3 32 0.11	N. 14 58 54.0	86.34
1	2 2 46.71	7 16 24.1	108.19	1	3 33 57.21	15 7 30.2	85.72
2	2 4 38.45	7 27 12.3	107.87	2	3 35 54.48	15 16 2.6	85.09
3	2 6 30.24	7 37 58.5	107.53	3	3 37 51.92	15 24 31.3	84.47
4	2 8 22.08	7 48 42.7	107.20	4	3 39 49.54	15 32 56.2	83.84
5	2 10 13.99	7 59 24.9	106.86	5	3 41 47.33	15 41 17.4	83.20
6	2 12 5.96	8 10 5.0	106.51	6	3 43 45.30	15 49 34.6	82.54
7	2 13 57.99	8 20 43.0	106.16	7	3 45 43.45	15 57 47.9	81.90
8	2 15 50.09	8 31 18.9	105.80	8	3 47 41.78	16 5 57.4	81.24
9	2 17 42.26	8 41 52.6	105.43	9	3 49 40.29	16 14 2.8	80.57
10	2 19 34.51	8 52 24.1	105.07	10	3 51 38.99	16 22 4.2	79.90
11	2 21 26.83	9 2 53.4	104.68	11	3 53 37.87	16 30 1.6	79.22
12	2 23 19.23	9 13 20.3	104.29	12	3 55 36.95	16 37 54.8	78.53
13	2 25 11.71	9 23 44.9	103.91	13	3 57 36.21	16 45 43.9	77.84
14	2 27 4.28	9 34 7.2	103.52	14	3 59 35.66	16 53 28.9	77.15
15	2 28 56.93	9 44 27.1	103.11	15	4 1 35.31	17 1 9.7	76.44
16	2 30 49.67	9 54 44.5	102.69	16	4 3 35.15	17 8 46.2	75.73
17	2 32 42.51	10 4 59.4	102.28	17	4 5 35.18	17 16 18.4	75.01
18	2 34 35.44	10 15 11.9	101.86	18	4 7 35.42	17 23 46.3	74.28
19	2 36 28.47	10 25 21.8	101.43	19	4 9 35.85	17 31 9.8	73.56
20	2 38 21.60	10 35 29.1	101.00	20	4 11 36.48	17 38 29.0	72.83
21	2 40 14.83	10 45 33.8	100.57	21	4 13 37.31	17 45 43.7	72.08
22	2 42 8.17	10 55 35.9	100.12	22	4 15 38.35	17 52 53.9	71.32
23	2 44 1.62	N. 11 5 35.2	99.66	23	4 17 39.59	N. 17 59 59.5	70.56
<b>WEDNESDAY 14.</b>				<b>FRIDAY 16.</b>			
0	2 45 55.17	N. 11 15 31.8	99.20	0	4 19 41.03	N. 18 7 0.6	69.80
1	2 47 48.84	11 25 25.6	98.74	1	4 21 42.68	18 13 57.1	69.03
2	2 49 42.63	11 35 16.7	98.28	2	4 23 44.54	18 20 49.0	68.25
3	2 51 36.53	11 45 4.9	97.79	3	4 25 46.60	18 27 36.1	67.47
4	2 53 30.56	11 54 50.2	97.31	4	4 27 48.88	18 34 18.6	66.68
5	2 55 24.71	12 4 32.6	96.83	5	4 29 51.37	18 40 56.3	65.88
6	2 57 18.98	12 14 12.1	96.33	6	4 31 54.06	18 47 29.2	65.08
7	2 59 13.39	12 23 48.6	95.82	7	4 33 56.97	18 53 57.2	64.27
8	3 1 7.92	12 33 22.0	95.31	8	4 36 0.09	19 0 20.4	63.46
9	3 3 2.59	12 42 52.3	94.80	9	4 38 3.42	19 6 38.7	62.63
10	3 4 57.39	12 52 19.6	94.28	10	4 40 6.97	19 12 52.0	61.80
11	3 6 52.33	13 1 43.7	93.75	11	4 42 10.73	19 19 0.3	60.97
12	3 8 47.41	13 11 4.6	93.22	12	4 44 14.71	19 25 3.6	60.13
13	3 10 42.63	13 20 22.3	92.68	13	4 46 18.91	19 31 1.8	59.28
14	3 12 38.00	13 29 36.7	92.13	14	4 48 23.32	19 36 54.9	58.42
15	3 14 33.52	13 38 47.9	91.58	15	4 50 27.95	19 42 42.8	57.56
16	3 16 29.18	13 47 55.7	91.02	16	4 52 32.79	19 48 25.6	56.69
17	3 18 24.99	13 57 0.2	90.46	17	4 54 37.85	19 54 3.1	55.81
18	3 20 20.96	14 6 1.2	89.88	18	4 56 43.14	19 59 35.3	54.93
19	3 22 17.08	14 14 58.8	89.32	19	4 58 48.64	20 5 2.2	54.04
20	3 24 13.36	14 23 53.0	88.73	20	5 0 54.35	20 10 23.8	53.14
21	3 26 9.81	14 32 43.6	88.13	21	5 3 0.29	20 15 39.9	52.23
22	3 28 6.41	14 41 30.6	87.54	22	5 5 6.45	20 20 50.6	51.33
23	3 30 3.17	14 50 14.1	86.95	23	5 7 12.82	20 25 55.9	50.42
24	3 32 0.11	N. 14 58 54.0	86.34	24	5 9 19.41	N. 20 30 55.6	49.49



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 17.</b>				<b>MONDAY 19.</b>			
0	5 9 19.41	N.20 30 55.6	49.49	0	6 54 39.38	N.22 30 27.7	1.87
1	5 11 26.22	20 35 49.8	48.56	1	6 56 55.54	22 30 12.9	3.06
2	5 13 33.26	20 40 38.3	47.62	2	6 59 11.85	22 29 51.0	4.26
3	5 15 40.51	20 45 21.2	46.68	3	7 1 28.30	22 29 21.8	5.47
4	5 17 47.98	20 49 58.5	45.74	4	7 3 44.90	22 28 45.4	6.67
5	5 19 55.67	20 54 30.1	44.78	5	7 6 1.64	22 28 1.8	7.88
6	5 22 3.57	20 58 55.9	43.82	6	7 8 18.52	22 27 10.9	9.09
7	5 24 11.70	21 3 15.9	42.85	7	7 10 35.53	22 26 12.7	10.32
8	5 26 20.04	21 7 30.1	41.88	8	7 12 52.67	22 25 7.1	11.53
9	5 28 28.59	21 11 38.5	40.90	9	7 15 9.94	22 23 54.3	12.75
10	5 30 37.36	21 15 40.9	39.91	10	7 17 27.34	22 22 34.1	13.98
11	5 32 46.35	21 19 37.4	38.92	11	7 19 44.87	22 21 6.5	15.22
12	5 34 55.55	21 23 28.0	37.92	12	7 22 2.51	22 19 31.5	16.45
13	5 37 4.97	21 27 12.5	36.92	13	7 24 20.27	22 17 49.1	17.68
14	5 39 14.60	21 30 51.0	35.91	14	7 26 38.15	22 15 59.4	18.91
15	5 41 24.44	21 34 23.4	34.89	15	7 28 56.14	22 14 2.2	20.16
16	5 43 34.49	21 37 49.7	33.86	16	7 31 14.23	22 11 57.5	21.40
17	5 45 44.75	21 41 9.7	32.83	17	7 33 32.44	22 9 45.4	22.63
18	5 47 55.22	21 44 23.6	31.80	18	7 35 50.75	22 7 25.9	23.88
19	5 50 5.90	21 47 31.3	30.76	19	7 38 9.15	22 4 58.8	25.14
20	5 52 16.79	21 50 32.7	29.71	20	7 40 27.65	22 2 24.2	26.38
21	5 54 27.88	21 53 27.8	28.65	21	7 42 46.25	21 59 42.2	27.63
22	5 56 39.18	21 56 16.5	27.59	22	7 45 4.94	21 56 52.6	28.89
23	5 58 50.68	N.21 58 58.9	26.52	23	7 47 23.72	N.21 53 55.5	30.14
<b>SUNDAY 18.</b>				<b>TUESDAY 20.</b>			
0	6 1 2.38	N.22 1 34.8	25.45	0	7 49 42.58	N.21 50 50.9	31.39
1	6 3 14.28	22 4 4.3	24.37	1	7 52 1.53	21 47 38.8	32.65
2	6 5 26.39	22 6 27.3	23.29	2	7 54 20.55	21 44 19.1	33.91
3	6 7 38.69	22 8 43.8	22.20	3	7 56 39.65	21 40 51.9	35.17
4	6 9 51.18	22 10 53.7	21.11	4	7 58 58.83	21 37 17.1	36.42
5	6 12 3.87	22 12 57.1	20.01	5	8 1 18.07	21 33 34.8	37.68
6	6 14 16.75	22 14 53.8	18.90	6	8 3 37.38	21 29 44.9	38.94
7	6 16 29.83	22 16 43.9	17.79	7	8 5 56.75	21 25 47.5	40.20
8	6 18 43.09	22 18 27.3	16.67	8	8 8 16.19	21 21 42.5	41.46
9	6 20 56.54	22 20 3.9	15.54	9	8 10 35.68	21 17 30.0	42.71
10	6 23 10.18	22 21 33.8	14.42	10	8 12 55.22	21 13 10.0	43.97
11	6 25 24.00	22 22 57.0	13.29	11	8 15 14.82	21 8 42.4	45.23
12	6 27 38.00	22 24 13.3	12.15	12	8 17 34.47	21 4 7.2	46.49
13	6 29 52.18	22 25 22.8	11.01	13	8 19 54.16	20 59 24.5	47.74
14	6 32 6.54	22 26 25.4	9.87	14	8 22 13.90	20 54 34.3	49.00
15	6 34 21.07	22 27 21.2	8.72	15	8 24 33.68	20 49 36.5	50.25
16	6 36 35.78	22 28 10.0	7.56	16	8 26 53.49	20 44 31.3	51.50
17	6 38 50.65	22 28 51.9	6.39	17	8 29 13.34	20 39 18.5	52.76
18	6 41 5.70	22 29 26.7	5.23	18	8 31 33.22	20 33 58.2	54.00
19	6 43 20.91	22 29 54.6	4.06	19	8 33 53.13	20 28 30.5	55.24
20	6 45 36.28	22 30 15.4	2.88	20	8 36 13.07	20 22 55.3	56.49
21	6 47 51.82	22 30 29.1	1.70	21	8 38 33.03	20 17 12.6	57.73
22	6 50 7.52	22 30 35.8	0.52	22	8 40 53.01	20 11 22.5	58.97
23	6 52 23.37	22 30 35.3	0.67	23	8 43 13.00	20 5 25.0	60.21
24	6 54 39.38	N.22 30 27.7	1.87	24	8 45 33.02	N.19 59 20.0	61.45



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 21.</b>				<b>FRIDAY 23.</b>			
0	h m s	N. ° ' "	"	0	h m s	N. ° ' "	"
0	8 45 33.02	N. 19 59 20.0	61.45	0	10 37 12.60	N. 12 51 27.0	114.13
1	8 47 53.05	19 53 7.6	62.68	1	10 39 31.21	12 39 59.6	115.02
2	8 50 13.08	19 46 47.9	63.90	2	10 41 49.77	12 28 26.8	115.90
3	8 52 33.13	19 40 20.8	65.13	3	10 44 8.29	12 16 48.8	116.77
4	8 54 53.18	19 33 46.3	66.35	4	10 46 26.76	12 5 5.6	117.63
5	8 57 13.23	19 27 4.6	67.57	5	10 48 45.18	11 53 17.3	118.47
6	8 59 33.28	19 20 15.5	68.79	6	10 51 3.56	11 41 24.0	119.29
7	9 1 53.33	19 13 19.1	70.00	7	10 53 21.89	11 29 25.8	120.12
8	9 4 13.38	19 6 15.5	71.20	8	10 55 40.17	11 17 22.6	120.93
9	9 6 33.42	18 59 4.7	72.41	9	10 57 58.41	11 5 14.6	121.73
10	9 8 53.45	18 51 46.6	73.62	10	11 0 16.61	10 53 1.9	122.51
11	9 11 13.48	18 44 21.3	74.81	11	11 2 34.76	10 40 44.5	123.28
12	9 13 33.49	18 36 48.9	75.99	12	11 4 52.87	10 28 22.5	124.04
13	9 15 53.49	18 29 9.4	77.18	13	11 7 10.94	10 15 56.0	124.78
14	9 18 13.47	18 21 22.8	78.36	14	11 9 28.97	10 3 25.1	125.52
15	9 20 33.43	18 13 29.1	79.53	15	11 11 46.97	9 50 49.8	126.24
16	9 22 53.37	18 5 28.5	80.68	16	11 14 4.92	9 38 10.2	126.95
17	9 25 13.29	17 57 20.8	81.84	17	11 16 22.84	9 25 26.4	127.64
18	9 27 33.18	17 49 6.2	83.01	18	11 18 40.72	9 12 38.5	128.32
19	9 29 53.05	17 40 44.6	84.17	19	11 20 58.56	8 59 46.5	128.99
20	9 32 12.89	17 32 16.2	85.31	20	11 23 16.38	8 46 50.6	129.64
21	9 34 32.71	17 23 40.9	86.45	21	11 25 34.16	8 33 50.8	130.29
22	9 36 52.49	17 14 58.8	87.58	22	11 27 51.91	8 20 47.1	130.92
23	9 39 12.24	N. 17 6 9.9	88.71	23	11 30 9.63	N. 8 7 39.8	131.52
<b>THURSDAY 22.</b>				<b>SATURDAY 24.</b>			
0	9 41 31.96	N. 16 57 14.3	89.82	0	11 32 27.32	N. 7 54 28.9	132.12
1	9 43 51.64	16 48 12.1	90.93	1	11 34 44.99	7 41 14.4	132.70
2	9 46 11.29	16 39 3.2	92.03	2	11 37 2.63	7 27 56.5	133.27
3	9 48 30.90	16 29 47.7	93.13	3	11 39 20.25	7 14 35.2	133.82
4	9 50 50.47	16 20 25.6	94.22	4	11 41 37.85	7 1 10.7	134.36
5	9 53 10.00	16 10 57.1	95.29	5	11 43 55.43	6 47 42.9	134.89
6	9 55 29.49	16 1 22.1	96.37	6	11 46 12.99	6 34 12.0	135.40
7	9 57 48.94	15 51 40.7	97.43	7	11 48 30.53	6 20 38.1	135.89
8	10 0 8.35	15 41 52.9	98.49	8	11 50 48.06	6 7 1.3	136.37
9	10 2 27.71	15 31 58.8	99.54	9	11 53 5.58	5 53 21.7	136.83
10	10 4 47.03	15 21 58.4	100.58	10	11 55 23.09	5 39 39.3	137.29
11	10 7 6.31	15 11 57.8	101.61	11	11 57 40.58	5 25 54.2	137.73
12	10 9 25.53	15 1 39.1	102.63	12	11 59 58.07	5 12 6.6	138.14
13	10 11 44.71	14 51 20.3	103.64	13	12 2 15.56	4 58 16.5	138.54
14	10 14 3.85	14 40 55.4	104.64	14	12 4 33.04	4 44 24.1	138.93
15	10 16 22.94	14 30 24.6	105.63	15	12 6 50.52	4 30 29.4	139.30
16	10 18 41.98	14 19 47.8	106.62	16	12 9 8.00	4 16 32.5	139.66
17	10 21 0.98	14 9 5.1	107.60	17	12 11 25.49	4 2 33.5	140.00
18	10 23 19.93	13 58 16.6	108.56	18	12 13 42.98	3 48 32.5	140.33
19	10 25 38.83	13 47 22.4	109.52	19	12 16 0.48	3 34 29.6	140.63
20	10 27 57.68	13 36 22.4	110.46	20	12 18 17.99	3 20 24.9	140.92
21	10 30 16.48	13 25 16.9	111.39	21	12 20 35.51	3 6 18.5	141.20
22	10 32 35.23	13 14 5.8	112.32	22	12 22 53.05	2 52 10.5	141.47
23	10 34 53.94	13 3 49.1	113.23	23	12 25 10.60	2 38 0.9	141.71
24	10 37 12.60	N. 12 51 27.0	114.13	24	12 27 28.16	N. 2 23 50.0	141.93



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 25.</b>				<b>TUESDAY 27.</b>			
0	h m s	° ' "	"	0	h m s	S. ° ' "	"
1	12 27 28.16	N. 2 23 50.0	141.93	1	14 18 39.39	S. 8 51 40.5	133.01
2	12 29 45.75	2 9 37.8	142.14	2	14 21 0.70	9 4 56.8	132.41
3	12 32 3.36	1 55 24.3	142.34	3	14 23 22.14	9 18 9.4	131.79
4	12 34 21.00	1 41 9.7	142.52	4	14 25 43.70	9 31 18.3	131.17
5	12 36 38.67	1 26 54.1	142.68	5	14 28 5.40	9 44 23.4	130.52
6	12 38 56.37	1 12 37.6	142.82	6	14 30 27.22	9 57 24.5	129.85
7	12 41 14.10	0 58 20.2	142.95	7	14 32 49.18	10 10 21.6	129.17
8	12 43 31.86	0 44 2.2	143.06	8	14 35 11.28	10 23 14.6	128.48
9	12 45 49.66	0 29 43.5	143.16	9	14 37 33.51	10 36 3.4	127.77
10	12 48 7.51	0 15 24.3	143.24	10	14 39 55.87	10 48 47.9	127.05
11	12 50 25.39	N. 0 1 4.6	143.30	11	14 42 18.37	11 1 28.0	126.31
12	12 52 43.32	S. 0 13 15.3	143.34	12	14 44 41.01	11 14 3.6	125.55
13	12 55 1.29	0 27 35.5	143.37	13	14 47 3.79	11 26 34.6	124.78
14	12 57 19.31	0 41 55.8	143.38	14	14 49 26.71	11 39 0.9	123.99
15	12 59 37.39	0 56 16.1	143.37	15	14 51 49.76	11 51 22.5	123.19
16	13 1 55.52	1 10 36.2	143.34	16	14 54 12.96	12 3 39.2	122.37
17	13 4 13.71	1 24 56.2	143.31	17	14 56 36.30	12 15 51.0	121.54
18	13 6 31.95	1 39 15.9	143.25	18	14 58 59.79	12 27 57.7	120.69
19	13 8 50.26	1 53 35.2	143.17	19	15 1 23.41	12 39 59.3	119.83
20	13 11 8.63	2 7 54.0	143.08	20	15 3 47.18	12 51 55.7	118.96
21	13 13 27.07	2 22 12.2	142.97	21	15 6 11.09	13 3 46.8	118.07
22	13 15 45.58	2 36 29.7	142.85	22	15 8 35.14	13 15 32.5	117.17
23	13 18 4.16	2 50 46.4	142.71	23	15 10 59.33	13 27 12.8	116.25
24	13 20 22.81	S. 3 5 2.2	142.54	24	15 13 23.67	S. 13 38 47.5	115.31
<b>MONDAY 26.</b>				<b>WEDNESDAY 28.</b>			
0	13 22 41.53	S. 3 19 16.9	142.36	0	15 15 48.16	S. 13 50 16.5	114.36
1	13 25 0.33	3 33 30.5	142.17	1	15 18 12.79	14 1 39.8	113.41
2	13 27 19.22	3 47 42.9	141.96	2	15 20 37.56	14 12 57.4	112.44
3	13 29 38.19	4 1 54.0	141.73	3	15 23 2.47	14 24 9.1	111.45
4	13 31 57.24	4 16 3.7	141.48	4	15 25 27.52	14 35 14.8	110.44
5	13 34 16.37	4 30 11.8	141.22	5	15 27 52.72	14 46 14.4	109.43
6	13 36 35.60	4 44 18.3	140.94	6	15 30 18.06	14 57 8.0	108.41
7	13 38 54.92	4 58 23.1	140.65	7	15 32 43.54	15 7 55.3	107.37
8	13 41 14.34	5 12 26.1	140.33	8	15 35 9.16	15 18 36.4	106.32
9	13 43 33.85	5 26 27.1	139.99	9	15 37 34.92	15 29 11.1	105.25
10	13 45 53.46	5 40 26.0	139.64	10	15 40 0.82	15 39 39.4	104.17
11	13 48 13.17	5 54 22.8	139.28	11	15 42 26.86	15 50 1.2	103.09
12	13 50 32.98	6 8 17.4	138.90	12	15 44 53.03	16 0 16.5	101.99
13	13 52 52.90	6 22 9.6	138.50	13	15 47 19.34	16 10 25.1	100.87
14	13 55 12.92	6 35 59.4	138.08	14	15 49 45.78	16 20 27.0	99.75
15	13 57 33.05	6 49 46.6	137.65	15	15 52 12.35	16 30 22.1	98.61
16	13 59 53.29	7 3 31.2	137.20	16	15 54 39.06	16 40 10.3	97.47
17	14 2 13.64	7 17 13.0	136.73	17	15 57 5.89	16 49 51.7	96.31
18	14 4 34.11	7 30 52.0	136.25	18	15 59 32.85	16 59 26.0	95.14
19	14 6 54.69	7 44 28.0	135.75	19	16 1 59.94	17 8 53.3	93.97
20	14 9 15.39	7 58 1.0	135.23	20	16 4 27.16	17 18 13.6	92.78
21	14 11 36.21	8 11 30.8	134.70	21	16 6 54.50	17 27 26.6	91.57
22	14 13 57.15	8 24 57.4	134.16	22	16 9 21.95	17 36 32.4	90.36
23	14 16 18.21	8 38 20.7	133.59	23	16 11 49.53	17 45 30.9	89.14
24	14 18 39.39	S. 8 51 40.5	133.01	24	16 14 17.22	S. 17 54 22.1	87.91



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. De for 10 <sup>m</sup>
<b>THURSDAY 29.</b>				<b>FRIDAY 30.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	16 14 17.22	S. 17 54 22.1	87.91	0	17 13 49.57	S. 20 47 49.1	55.95
1	16 16 45.03	18 3 5.8	86.67	1	17 16 19.21	20 53 20.6	54.54
2	16 19 12.95	18 11 42.1	85.42	2	17 18 48.89	20 58 43.6	53.13
3	16 21 40.97	18 20 10.8	84.16	3	17 21 18.59	21 3 58.2	51.72
4	16 24 9.11	18 28 32.0	82.89	4	17 23 48.31	21 9 4.2	50.29
5	16 26 37.35	18 36 45.5	81.61	5	17 26 18.05	21 14 1.7	48.87
6	16 29 5.69	18 44 51.3	80.33	6	17 28 47.81	21 18 50.7	47.45
7	16 31 34.13	18 52 49.4	79.03	7	17 31 17.57	21 23 31.1	46.02
8	16 34 2.66	19 0 39.6	77.72	8	17 33 47.33	21 28 2.9	44.58
9	16 36 31.28	19 8 22.1	76.42	9	17 36 17.09	21 32 26.1	43.15
10	16 39 0.00	19 15 56.7	75.10	10	17 38 46.85	21 36 40.7	41.70
11	16 41 28.80	19 23 23.3	73.77	11	17 41 16.60	21 40 46.7	40.27
12	16 43 57.69	19 30 41.9	72.43	12	17 43 46.33	21 44 44.0	38.83
13	16 46 26.66	19 37 52.5	71.10	13	17 46 16.04	21 48 32.7	37.39
14	16 48 55.70	19 44 55.1	69.76	14	17 48 45.73	21 52 12.7	35.94
15	16 51 24.82	19 51 49.6	68.40	15	17 51 15.39	21 55 44.0	34.50
16	16 53 54.01	19 58 35.9	67.03	16	17 53 45.02	21 59 6.7	33.07
17	16 56 23.26	20 5 14.0	65.67	17	17 56 14.61	22 2 20.8	31.62
18	16 58 52.58	20 11 43.9	64.30	18	17 58 44.15	22 5 26.1	30.16
19	17 1 21.96	20 18 5.6	62.92	19	18 1 13.64	22 8 22.7	28.72
20	17 3 51.39	20 24 19.0	61.54	20	18 3 43.08	22 11 10.7	27.28
21	17 6 20.87	20 30 24.1	60.15	21	18 6 12.47	22 13 50.0	25.83
22	17 8 50.39	20 36 20.8	58.76	22	18 8 41.79	22 16 20.6	24.38
23	17 11 19.96	20 42 9.2	57.36	23	18 11 11.04	22 18 42.5	22.93
24	17 13 49.57	S. 20 47 49.1	55.95	24	18 13 40.22	S. 22 20 55.7	21.48

## PHASES OF THE MOON.

Sept. 2	☾	First Quarter	- - - - -	<sup>h</sup> <sup>m</sup>
9	☉	Full Moon	- - - - -	1 57.8
17	☾	Last Quarter	- - - - -	10 11.6
24	●	New Moon	- - - - -	13 29.8
			- - - - -	18 34.0

Sept. 14	☾	Apogee	- - - - -	<sup>h</sup>
26	☾	Perigee	- - - - -	7
			- - - - -	8



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	SUN W.	75 46 59	2585	77 26 15	2593	79 5 20	2600	80 44 15	2609
	Spica W.	33 5 2	2378	34 49 8	2376	36 33 17	2376	38 17 26	2376
	$\alpha$ Aquilæ E.	66 35 41	3057	65 6 39	3088	63 38 15	3121	62 10 30	3157
	Fomalhaut E.	98 27 26	2477	96 45 41	2484	95 4 5	2490	93 22 37	2496
2	SUN W.	88 55 59	2651	90 33 45	2660	92 11 19	2668	93 48 42	2677
	Spica W.	46 57 38	2391	48 41 26	2396	50 25 6	2401	52 8 39	2407
	$\alpha$ Aquilæ E.	55 3 36	3282	53 40 59	3439	52 19 27	3501	50 59 4	3569
	Fomalhaut E.	84 57 52	2537	83 17 31	2546	81 37 22	2557	79 57 28	2567
	$\alpha$ Pegasi E.	101 6 25	2735	99 30 32	2740	97 54 45	2744	96 19 4	2750
3	SUN W.	101 52 31	2723	103 28 40	2733	105 4 36	2742	106 40 21	2752
	Spica W.	60 44 14	2439	62 26 53	2446	64 9 22	2453	65 51 41	2461
	Antares W.	16 8 41	2935	17 40 16	2850	19 13 39	2788	20 48 23	2741
	Fomalhaut E.	71 41 47	2627	70 3 29	2641	68 25 30	2655	66 47 50	2670
	$\alpha$ Pegasi E.	88 22 47	2888	86 48 4	2798	85 13 34	2808	83 39 17	2820
4	SUN W.	114 35 54	2799	116 10 23	2809	117 44 39	2818	119 18 43	2828
	Spica W.	74 20 34	2500	76 1 48	2507	77 42 51	2515	79 23 43	2524
	Antares W.	28 53 16	2634	30 31 25	2626	32 9 45	2621	33 48 12	2618
	Fomalhaut E.	58 44 48	2756	57 9 22	2776	55 34 23	2797	53 59 51	2819
	$\alpha$ Pegasi E.	75 51 48	2886	74 19 11	2902	72 46 55	2918	71 14 59	2935
5	SUN W.	127 5 51	2879	128 38 37	2888	130 11 11	2898	131 43 32	2909
	Spica W.	87 45 9	2566	89 24 51	2574	91 4 22	2582	92 43 41	2591
	Antares W.	42 0 55	2621	43 39 22	2624	45 17 45	2628	46 56 2	2632
	Saturn W.	27 49 2	2540	29 29 19	2549	31 9 24	2557	32 49 18	2566
	Fomalhaut E.	46 15 9	2958	44 44 3	2993	43 13 41	3030	41 44 5	3071
	$\alpha$ Pegasi E.	63 41 15	3039	62 11 50	3063	60 42 55	3089	59 14 32	3116
6	Antares W.	55 5 51	2660	56 43 25	2666	58 20 51	2673	59 58 7	2679
	Saturn W.	41 5 53	2608	42 44 38	2617	44 23 10	2625	46 1 31	2634
	$\alpha$ Pegasi E.	52 1 42	3286	50 37 14	3328	49 13 35	3373	47 50 47	3422
	$\alpha$ Arietis E.	93 0 0	2747	91 24 22	2756	89 48 56	2764	88 13 41	2772
7	Antares W.	68 2 9	2716	69 38 28	2724	71 14 36	2732	72 50 34	2740
	Saturn W.	54 10 19	2677	55 47 29	2686	57 24 28	2695	59 1 14	2704
	$\alpha$ Arietis E.	80 20 27	2821	78 46 27	2831	77 12 40	2842	75 39 7	2854
	Aldebaran E.	111 30 14	2673	109 52 58	2682	108 15 54	2691	106 39 2	2699
8	Antares W.	80 47 41	2782	82 22 33	2790	83 57 14	2798	85 31 44	2808
	Saturn W.	67 2 10	2748	68 37 46	2758	70 13 9	2766	71 48 22	2775
	$\alpha$ Aquilæ W.	42 53 45	4414	43 58 54	4327	45 5 22	4249	46 13 2	4179
	$\alpha$ Arietis E.	67 55 4	2913	66 23 2	2927	64 51 17	2940	63 19 49	2954
	Aldebaran E.	98 37 36	2743	97 1 53	2753	95 26 23	2762	93 51 5	2770
9	Saturn W.	79 41 25	2820	81 15 27	2829	82 49 17	2838	84 22 55	2847
	$\alpha$ Aquilæ W.	52 5 53	3926	53 18 46	3891	54 32 15	3858	55 46 18	3829
	$\alpha$ Arietis E.	55 47 6	3032	54 17 33	3050	52 48 23	3069	51 19 35	3088
	Aldebaran E.	85 57 27	2815	84 23 19	2824	82 49 22	2833	81 15 37	2842
	Jupiter E.	102 43 49	2850	101 10 26	2859	99 37 15	2868	98 4 15	2877
10	Saturn W.	92 8 16	2891	93 40 46	2900	95 13 5	2908	96 45 14	2917
	$\alpha$ Aquilæ W.	62 2 57	3726	63 19 16	3712	64 35 50	3700	65 52 37	3689



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	SUN W.	82 22 58	2616	84 1 31	2625	85 39 52	2634	87 18 1	2642
	Spica W.	40 1 35	2378	41 45 42	2380	43 29 46	2383	45 13 45	2387
	α Aquilæ E.	60 43 29	3195	59 17 14	3236	57 51 47	3281	56 27 13	3330
	Fomalhaut E.	91 41 18	2504	90 0 10	2511	88 19 12	2520	86 38 26	2528
2	SUN W.	95 25 52	2686	97 2 50	2695	98 39 36	2704	100 16 10	2714
	Spica W.	53 52 4	2413	55 35 20	2419	57 18 27	2425	59 1 26	2433
	α Aquilæ E.	49 39 56	3642	48 22 7	3723	47 5 44	3811	45 50 53	3908
	Fomalhaut E.	78 17 48	2579	76 38 24	2590	74 59 15	2602	73 20 23	2614
	α Pegasi E.	94 43 30	2756	93 8 5	2763	91 32 49	2771	89 57 43	2779
3	SUN W.	108 15 52	2761	109 51 12	2771	111 26 18	2780	113 1 12	2789
	Spica W.	67 33 49	2469	69 15 46	2476	70 57 33	2484	72 39 9	2492
	Antares W.	22 24 9	2706	24 0 41	2680	25 37 48	2660	27 15 22	2645
	Fomalhaut E.	65 10 30	2686	63 33 31	2702	61 56 54	2719	60 20 39	2737
	α Pegasi E.	82 5 15	2832	80 31 28	2844	78 57 57	2858	77 24 44	2871
4	SUN W.	120 52 34	2838	122 26 12	2848	123 59 38	2858	125 32 51	2868
	Spica W.	81 4 23	2532	82 44 52	2540	84 25 9	2548	86 5 15	2557
	Antares W.	35 26 43	2616	37 5 17	2615	38 43 51	2616	40 22 24	2618
	Fomalhaut E.	52 25 48	2843	50 52 16	2869	49 19 18	2897	47 46 55	2926
	α Pegasi E.	69 43 25	2954	68 12 15	2973	66 41 28	2994	65 11 8	3016
5	SUN W.	133 15 40	2920	134 47 34	2930	136 19 15	2941	137 50 42	2952
	Spica W.	94 22 48	2599	96 1 44	2609	97 40 27	2618	99 18 58	2627
	Antares W.	48 34 14	2637	50 12 19	2642	51 50 17	2647	53 28 8	2653
	Saturn W.	34 29 0	2574	36 8 31	2582	37 47 50	2591	39 26 58	2600
	Fomalhaut E.	40 15 20	3116	38 47 30	3166	37 20 40	3222	35 54 57	3283
	α Pegasi E.	57 46 42	3145	56 19 27	3177	54 52 51	3211	53 26 55	3247
6	Antares W.	61 35 15	2686	63 12 13	2693	64 49 2	2701	66 25 41	2709
	Saturn W.	47 39 40	2643	49 17 37	2651	50 55 23	2660	52 32 57	2669
	α Pegasi E.	46 28 56	3475	45 8 4	3533	43 48 16	3597	42 29 38	3665
	α Arietis E.	86 38 37	2782	85 3 46	2791	83 29 7	2801	81 54 41	2811
7	Antares W.	74 26 21	2748	76 1 57	2756	77 37 23	2765	79 12 37	2773
	Saturn W.	60 37 49	2713	62 14 12	2722	63 50 23	2730	65 26 23	2740
	α Arietis E.	74 5 49	2864	72 32 44	2876	70 59 55	2889	69 27 22	2901
	Aldebaran E.	105 2 21	2708	103 25 52	2717	101 49 35	2726	100 13 29	2735
8	Antares W.	87 6 2	2816	88 40 9	2825	90 14 5	2834	91 47 49	2843
	Saturn W.	73 23 22	2785	74 58 10	2793	76 32 47	2802	78 7 12	2811
	α Aquilæ W.	47 21 48	4117	48 31 33	4062	49 42 11	4011	50 53 40	3966
	α Arietis E.	61 48 38	2969	60 17 46	2984	58 47 13	2999	57 16 59	3016
	Aldebaran E.	92 15 58	2779	90 41 3	2788	89 6 19	2797	87 31 47	2806
9	Saturn W.	85 56 22	2856	87 29 38	2865	89 2 42	2874	90 35 34	2882
	α Aquilæ W.	57 0 50	3804	58 15 48	3781	59 31 10	3760	60 46 54	3742
	α Arietis E.	49 51 11	3109	48 23 12	3130	46 55 39	3153	45 28 34	3178
	Aldebaran E.	79 42 3	2850	78 8 40	2859	76 35 29	2868	75 2 29	2877
	Jupiter E.	96 31 26	2886	94 58 49	2894	93 26 22	2903	91 54 7	2912
10	Saturn W.	98 17 11	2925	99 48 58	2933	101 20 35	2942	102 52 1	2950
	α Aquilæ W.	67 9 36	3680	68 26 44	3672	69 44 1	3666	71 1 24	3660



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Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
10	$\alpha$ Arietis E.	44 1 59	3204	42 35 54	3232	41 10 22	3262	39 45 26	3295
	Aldebaran E.	73 29 41	2885	71 57 3	2894	70 24 37	2902	68 52 21	2912
	Jupiter E.	90 22 3	2920	88 50 9	2929	87 18 27	2937	85 46 55	2945
11	$\alpha$ Aquilæ W.	72 18 54	3657	73 36 27	3653	74 54 4	3650	76 11 44	3649
	Fomalhaut W.	37 5 15	3549	38 24 45	3517	39 44 50	3490	41 5 25	3466
	Aldebaran E.	61 13 43	2952	59 42 30	2961	58 11 28	2968	56 40 35	2975
	Jupiter E.	78 11 51	2985	76 41 20	2993	75 10 59	3001	73 40 47	3008
	Pollux E.	105 23 26	2976	103 52 43	2983	102 22 9	2990	100 51 44	2998
	Mars E.	115 12 58	3176	113 46 20	3183	112 19 51	3192	110 53 32	3200
12	$\alpha$ Aquilæ W.	82 40 7	3654	83 57 43	3657	85 15 16	3660	86 32 46	3664
	Fomalhaut W.	47 53 58	3386	49 16 31	3376	50 39 15	3366	52 2 10	3358
	$\alpha$ Pegasi W.	36 3 47	4358	37 9 46	4273	38 17 4	4197	39 25 33	4130
	Aldebaran E.	49 8 29	3011	47 38 30	3018	46 8 39	3025	44 38 57	3031
	Jupiter E.	66 12 2	3043	64 42 42	3048	63 13 29	3055	61 44 25	3061
	Pollux E.	93 21 49	3031	91 52 15	3038	90 22 49	3043	88 53 30	3049
	Mars E.	103 44 12	3236	102 18 45	3242	100 53 26	3249	99 28 15	3255
13	$\alpha$ Aquilæ W.	92 59 1	3691	94 15 57	3698	95 32 46	3705	96 49 28	3713
	Fomalhaut W.	58 58 45	3330	60 22 22	3326	61 46 4	3322	63 9 50	3319
	$\alpha$ Pegasi W.	45 22 11	3883	46 35 48	3848	47 50 1	3815	49 4 48	3786
	Aldebaran E.	37 12 14	3059	35 43 14	3064	34 14 20	3069	32 45 32	3073
	Jupiter E.	54 20 42	3086	52 52 15	3091	51 23 54	3094	49 55 37	3098
	Pollux E.	81 28 38	3075	79 59 58	3080	78 31 24	3084	77 2 55	3088
	Mars E.	92 24 0	3281	90 59 27	3286	89 34 59	3290	88 10 36	3294
	Venus E.	118 11 25	3527	116 51 31	3531	115 31 41	3536	114 11 57	3540
14	Fomalhaut W.	70 9 31	3306	71 33 36	3303	72 57 44	3301	74 21 55	3298
	$\alpha$ Pegasi W.	55 25 38	3669	56 42 58	3651	58 0 37	3634	59 18 35	3618
	Jupiter E.	42 35 13	3110	41 7 16	3113	39 39 22	3114	38 11 29	3115
	Pollux E.	69 41 36	3104	68 13 31	3105	66 45 28	3108	65 17 28	3109
	Mars E.	81 9 40	3307	79 45 37	3309	78 21 36	3311	76 57 37	3312
	Venus E.	107 34 15	3555	106 14 51	3556	104 55 29	3558	103 36 9	3559
	SUN E.	128 46 44	3470	127 25 46	3471	126 4 50	3471	124 43 54	3471
15	Fomalhaut W.	81 23 34	3285	82 48 3	3282	84 12 36	3279	85 37 12	3275
	$\alpha$ Pegasi W.	65 52 24	3550	67 11 53	3538	68 31 35	3527	69 51 29	3516
	Jupiter E.	30 52 12	3114	29 24 19	3112	27 56 24	3111	26 28 28	3108
	Pollux E.	57 57 45	3112	56 29 50	3111	55 1 54	3111	53 33 58	3110
	Mars E.	69 57 45	3309	68 33 44	3307	67 9 40	3305	65 45 35	3302
	Venus E.	96 59 34	3557	95 40 13	3555	94 20 49	3553	93 1 24	3550
	SUN E.	117 59 12	3468	116 38 12	3466	115 17 10	3463	113 56 4	3460
16	$\alpha$ Pegasi W.	76 33 59	3464	77 55 3	3454	79 16 18	3445	80 37 44	3436
	$\alpha$ Arietis W.	33 0 9	3564	34 19 23	3521	35 39 24	3482	37 0 9	3446
	Pollux E.	46 13 50	3101	44 45 41	3098	43 17 29	3095	41 49 13	3093
	Mars E.	58 44 8	3282	57 19 35	3276	55 54 56	3270	54 30 9	3264
	Venus E.	86 23 19	3529	85 3 27	3524	83 43 29	3517	82 23 24	3510
	SUN E.	107 9 36	3438	105 48 3	3432	104 26 23	3426	103 4 36	3419
17	$\alpha$ Pegasi W.	87 27 35	3388	88 50 5	3378	90 12 46	3369	91 35 38	3360
	$\alpha$ Arietis W.	43 53 2	3301	45 17 13	3277	46 41 52	3253	48 6 58	3230



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10	$\alpha$ Arietis E.	38 21 9	3330	36 57 32	3368	35 34 39	3411	34 12 35	3458
	Aldebaran E.	67 20 17	2920	65 48 23	2928	64 16 39	2936	62 45 6	2944
	Jupiter E.	84 15 33	2954	82 44 23	2962	81 13 22	2970	79 42 31	2978
11	$\alpha$ Aquilæ W.	77 29 25	3649	78 47 6	3649	80 4 48	3650	81 22 28	3651
	Fomalhaut W.	42 26 27	3445	43 47 52	3428	45 9 37	3413	46 31 39	3398
	Aldebaran E.	55 9 51	2983	53 39 17	2990	52 8 52	2997	50 38 36	3005
	Jupiter E.	72 10 44	3016	70 40 51	3022	69 11 6	3029	67 41 29	3037
	Pollux E.	99 21 28	3005	97 51 21	3011	96 21 22	3018	94 51 32	3024
	Mars E.	109 27 23	3207	108 1 22	3214	106 35 30	3222	105 9 47	3229
12	$\alpha$ Aquilæ W.	87 50 11	3668	89 7 32	3673	90 24 48	3679	91 41 57	3684
	Fomalhaut W.	53 25 14	3351	54 48 27	3345	56 11 47	3339	57 35 13	3334
	$\alpha$ Pegasi W.	40 35 6	4070	41 45 37	4015	42 57 2	3966	44 9 15	3922
	Aldebaran E.	43 9 22	3036	41 39 54	3043	40 10 34	3048	38 41 21	3053
	Jupiter E.	60 15 27	3066	58 46 36	3072	57 17 52	3077	55 49 14	3082
	Pollux E.	87 24 18	3056	85 55 14	3061	84 26 16	3065	82 57 24	3070
	Mars E.	98 3 11	3260	96 38 13	3267	95 13 23	3272	93 48 38	3277
13	$\alpha$ Aquilæ W.	98 6 1	3721	99 22 26	3730	100 38 41	3739	101 54 47	3748
	Fomalhaut W.	64 33 40	3316	65 57 33	3313	67 21 29	3310	68 45 29	3308
	$\alpha$ Pegasi W.	50 20 5	3758	51 35 51	3733	52 52 3	3710	54 8 40	3689
	Aldebaran E.	31 16 49	3078	29 48 12	3082	28 19 41	3086	26 51 14	3090
	Jupiter E.	48 27 25	3102	46 59 17	3105	45 31 13	3106	44 3 11	3109
	Pollux E.	75 34 31	3092	74 6 12	3095	72 37 56	3099	71 9 45	3101
	Mars E.	86 46 18	3297	85 22 3	3301	83 57 52	3304	82 33 45	3306
	Venus E.	112 52 17	3544	111 32 41	3547	110 13 9	3551	108 53 41	3553
14	Fomalhaut W.	75 46 9	3296	77 10 25	3293	78 34 45	3290	79 59 8	3288
	$\alpha$ Pegasi W.	60 36 50	3603	61 55 21	3588	63 14 8	3575	64 33 9	3563
	Jupiter E.	36 43 38	3115	35 15 47	3115	33 47 56	3115	32 20 4	3115
	Pollux E.	63 49 29	3110	62 21 32	3111	60 53 36	3111	59 25 40	3112
	Mars E.	75 33 39	3312	74 9 41	3312	72 45 43	3311	71 21 44	3311
	Venus E.	102 16 50	3559	100 57 31	3560	99 38 13	3559	98 18 54	3558
	Sun E.	123 22 58	3472	122 2 3	3472	120 41 7	3471	119 20 10	3470
15	Fomalhaut W.	87 1 53	3272	88 26 37	3268	89 51 26	3264	91 16 20	3260
	$\alpha$ Pegasi W.	71 11 36	3506	72 31 54	3495	73 52 24	3484	75 13 6	3474
	Jupiter E.	25 0 28	3105	23 32 25	3103	22 4 19	3100	20 36 9	3096
	Pollux E.	52 6 0	3109	50 38 1	3106	49 9 59	3105	47 41 56	3103
	Mars E.	64 21 26	3299	62 57 13	3296	61 32 57	3291	60 8 35	3287
	Venus E.	91 41 55	3547	90 22 23	3544	89 2 47	3539	87 43 6	3534
	Sun E.	112 34 55	3457	111 13 43	3453	109 52 26	3448	108 31 4	3443
16	$\alpha$ Pegasi W.	81 59 20	3425	83 21 8	3416	84 43 6	3407	86 5 15	3397
	$\alpha$ Arietis W.	38 21 33	3413	39 43 35	3382	41 6 12	3354	42 29 21	3327
	Pollux E.	40 20 55	3089	38 52 32	3087	37 24 7	3084	35 55 38	3082
	Mars E.	53 5 15	3257	51 40 13	3248	50 15 1	3241	48 49 41	3232
	Venus E.	81 3 11	3503	79 42 50	3495	78 22 20	3487	77 1 42	3478
	Sun E.	101 42 41	3412	100 20 38	3404	98 58 26	3396	97 36 5	3387
17	$\alpha$ Pegasi W.	92 58 40	3351	94 21 53	3341	95 45 17	3333	97 8 50	3324
	$\alpha$ Arietis W.	49 32 31	3209	50 58 30	3187	52 24 55	3166	53 51 45	3146



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		° ' "		° ' "		° ' "		° ' "	
17	Pollux E.	34 27 6	3079	32 58 31	3077	31 29 54	3076	30 1 15	3076
	Mars E.	47 24 10	3224	45 58 29	3215	44 32 37	3204	43 6 32	3194
	Venus E.	75 40 53	3469	74 19 54	3459	72 58 44	3449	71 37 23	3438
	Sun E.	96 13 34	3378	94 50 52	3368	93 27 59	3358	92 4 55	3347
18	α Arietis W.	55 18 59	3125	56 46 38	3106	58 14 40	3086	59 43 7	3067
	Aldebaran W.	22 34 54	2934	24 6 30	2918	25 38 26	2904	27 10 40	2888
	Mars E.	35 52 55	3135	34 25 28	3122	32 57 45	3109	31 29 46	3095
	Venus E.	64 47 22	3377	63 24 39	3363	62 1 40	3349	60 38 25	3335
	Sun E.	85 6 18	3287	83 41 51	3274	82 17 9	3260	80 52 11	3246
19	α Arietis W.	67 11 17	2970	68 42 7	2952	70 13 20	2932	71 44 58	2914
	Aldebaran W.	34 56 46	2811	36 30 59	2795	38 5 34	2778	39 40 31	2762
	Jupiter W.	17 11 59	2840	18 45 35	2822	20 19 34	2805	21 53 56	2788
	Mars E.	24 5 27	3019	22 35 38	3004	21 5 30	2988	19 35 2	2971
	Venus E.	53 37 51	3257	52 12 49	3240	50 47 27	3223	49 21 45	3205
	Sun E.	73 43 0	3170	72 16 15	3153	70 49 9	3137	69 21 44	3119
20	α Arietis W.	79 29 8	2819	81 3 11	2801	82 37 38	2782	84 12 30	2763
	Aldebaran W.	47 40 46	2676	49 17 58	2658	50 55 34	2640	52 33 35	2623
	Jupiter W.	29 51 26	2699	31 28 7	2681	33 5 12	2663	34 42 41	2645
	Sun E.	61 59 21	3031	60 29 47	3013	58 59 50	2994	57 29 30	2977
21	α Arietis W.	92 12 56	2672	93 50 14	2654	95 27 55	2637	97 6 0	2620
	Aldebaran W.	60 49 47	2531	62 30 17	2513	64 11 12	2494	65 52 33	2476
	Jupiter W.	42 56 20	2553	44 36 20	2535	46 16 45	2516	47 57 36	2497
	Pollux W.	17 37 19	2798	19 11 49	2778	20 47 38	2687	22 24 35	2643
	Sun E.	49 52 6	2884	48 19 26	2866	46 46 24	2848	45 12 58	2831
22	Aldebaran W.	74 25 42	2387	76 9 35	2369	77 53 54	2352	79 38 38	2335
	Jupiter W.	56 28 19	2407	58 11 44	2389	59 55 34	2371	61 39 50	2355
	Pollux W.	30 42 32	2478	32 24 16	2452	34 6 37	2427	35 49 33	2404
	Sun E.	37 20 11	2747	35 44 33	2732	34 8 36	2717	32 32 19	2704
27	Sun W.	31 31 22	2414	33 14 36	2415	34 57 50	2416	36 41 2	2419
	Antares E.	33 50 37	2195	32 2 2	2214	30 13 55	2237	28 26 22	2264
	Saturn E.	47 25 58	2077	45 34 24	2083	43 42 58	2088	41 51 40	2094
	α Aquilæ E.	82 58 15	2719	81 22 1	2731	79 46 3	2744	78 10 22	2759
	Fomalhaut E.	116 33 3	2317	114 47 28	2314	113 1 49	2311	111 16 7	2312
28	Sun W.	45 15 36	2446	46 58 5	2455	48 40 22	2463	50 22 28	2472
	Saturn E.	32 37 46	2132	30 47 36	2141	28 57 40	2151	27 7 58	2161
	α Aquilæ E.	70 17 48	2866	68 44 46	2894	67 12 20	2925	65 40 33	2958
	Fomalhaut E.	102 28 9	2328	100 42 51	2334	98 57 41	2342	97 12 42	2350
29	Sun W.	58 49 30	2525	60 30 8	2538	62 10 29	2549	63 50 34	2561
	α Aquilæ E.	58 13 10	3169	56 46 24	3223	55 20 42	3281	53 56 8	3343
	Fomalhaut E.	88 31 2	2401	86 47 29	2413	85 4 13	2426	83 21 16	2440
	α Pegasi E.	104 39 12	2615	103 0 38	2621	101 22 12	2628	99 43 55	2636
30	Sun W.	72 6 32	2629	73 44 47	2643	75 22 44	2656	77 0 23	2671
	Antares W.	13 8 9	3088	14 36 33	2934	16 8 9	2827	17 42 2	2752
	α Aquilæ E.	47 13 6	3746	45 57 7	3850	44 42 57	3964	43 30 42	4090
	Fomalhaut E.	74 51 39	2517	73 10 50	2535	71 30 26	2553	69 50 27	2572
	α Pegasi E.	91 35 36	2689	89 58 42	2702	88 22 5	2717	86 45 48	2731



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17	Pollux E.	28 32 36	3077	27 3 58	3080	25 35 24	3084	24 6 55	3091
	Mars E.	41 40 16	3183	40 13 47	3171	38 47 3	3160	37 20 6	3148
	Venus E.	70 15 49	3427	68 54 3	3415	67 32 3	3403	66 9 50	3390
	SUN E	90 41 38	3337	89 18 9	3325	87 54 26	3313	86 30 29	3300
18	α Arietis W.	61 11 57	3047	62 41 12	3028	64 10 50	3009	65 40 52	2990
	Aldebaran W.	28 43 14	2873	30 16 7	2858	31 49 20	2843	33 22 52	2826
	Mars E.	30 1 30	3081	28 32 57	3065	27 4 5	3051	25 34 55	3036
	Venus E.	59 14 54	3319	57 51 5	3305	56 26 59	3289	55 2 35	3272
	SUN E.	79 26 57	3231	78 1 25	3216	76 35 35	3201	75 9 27	3185
19	α Arietis W.	73 16 59	2895	74 49 25	2876	76 22 15	2857	77 55 29	2838
	Aldebaran W.	41 15 49	2745	42 51 29	2728	44 27 32	2711	46 3 57	2693
	Jupiter W.	23 28 40	2770	25 3 47	2753	26 39 17	2735	28 15 10	2718
	Mars E.	18 4 13	2954	16 33 3	2938	15 1 33	2922	13 29 42	2905
	Venus E.	47 55 42	3188	46 29 18	3171	45 2 34	3152	43 35 27	3134
	SUN E.	67 53 57	3102	66 25 50	3085	64 57 22	3067	63 28 32	3050
20	α Arietis W.	85 47 46	2744	87 23 27	2726	88 59 33	2708	90 36 2	2689
	Aldebaran W.	54 11 59	2604	55 50 49	2586	57 30 3	2568	59 9 42	2549
	Jupiter W.	36 20 35	2627	37 58 53	2608	39 37 37	2590	41 16 46	2572
	SUN E.	55 58 48	2958	54 27 42	2939	52 56 13	2921	51 24 21	2903
21	α Arietis W.	98 44 28	2603	100 23 19	2587	102 2 32	2571	103 42 7	2555
	Aldebaran W.	67 34 20	2458	69 16 32	2440	70 59 10	2422	72 42 13	2404
	Jupiter W.	49 38 54	2479	51 20 36	2460	53 2 45	2443	54 45 19	2424
	Pollux W.	24 2 32	2603	25 41 23	2568	27 21 2	2555	29 1 26	2535
	SUN E.	43 39 10	2812	42 4 58	2795	40 30 24	2779	38 55 28	2763
22	Aldebaran W.	81 23 46	2318	83 9 19	2302	84 55 15	2286	86 41 35	2270
	Jupiter W.	63 24 30	2338	65 9 34	2321	66 55 3	2304	68 40 56	2289
	Pollux W.	37 33 2	2382	39 17 3	2360	41 1 35	2340	42 46 36	2321
	SUN E.	30 55 45	2692	29 18 55	2681	27 41 50	2672	26 4 33	2666
27	SUN W.	38 24 10	2422	40 7 13	2427	41 50 9	2433	43 32 57	2439
	Antares E.	26 39 29	2295	24 53 22	2334	23 8 13	2381	21 24 11	2440
	Saturn E.	40 0 32	2100	38 9 33	2108	36 18 46	2115	34 28 10	2123
	α Aquilæ E.	76 35 1	2777	75 0 3	2796	73 25 29	2817	71 51 24	2840
	Fomalhaut E.	109 30 25	2313	107 44 45	2315	105 59 8	2318	104 13 35	2323
28	SUN W.	52 4 21	2482	53 46 0	2492	55 27 25	2502	57 8 35	2513
	Saturn E.	25 18 32	2172	23 29 22	2182	21 40 28	2194	19 51 52	2206
	α Aquilæ E.	64 9 27	2994	62 39 7	3033	61 9 35	3075	59 40 55	3120
	Fomalhaut E.	95 27 55	2358	93 43 20	2368	91 58 59	2378	90 14 53	2389
29	SUN W.	65 30 22	2575	67 9 51	2588	68 49 3	2601	70 27 57	2615
	α Aquilæ E.	52 32 46	3410	51 10 41	3484	49 49 59	3564	48 30 45	3651
	Fomalhaut E.	81 38 39	2454	79 56 21	2470	78 14 25	2485	76 32 51	2501
	α Pegasi E.	98 5 49	2645	96 27 55	2655	94 50 14	2665	93 12 47	2677
30	SUN W.	78 37 42	2685	80 14 42	2700	81 51 22	2714	83 27 44	2728
	Antares W.	19 17 33	2699	20 54 15	2661	22 31 47	2633	24 9 57	2615
	α Aquilæ E.	42 20 30	4229	41 12 31	4383	40 6 54	4554	39 3 49	4722
	Fomalhaut E.	68 10 53	2591	66 31 46	2611	64 53 5	2632	63 14 53	2653
	α Pegasi E.	85 9 49	2747	83 34 12	2763	81 58 55	2780	80 24 1	2798



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1.62885	1.24976	0.19181	1.43335	66.189	<sup>h</sup> 13 <sup>m</sup> 16 <sup>s</sup> 1.89
2	1.62997	1.25762	0.19237	1.43303	65.640	13 12 5.99
3	1.63103	1.26539	0.19293	1.43271	65.096	13 8 10.08
4	1.63203	1.27306	0.19348	1.43240	64.558	13 4 14.18
5	1.63299	1.28065	0.19402	1.43210	64.022	13 0 18.27
6	1.63389	1.28815	0.19456	1.43180	63.490	12 56 22.36
7	1.63475	1.29556	0.19509	1.43151	62.960	12 52 26.46
8	1.63555	1.30289	0.19562	1.43123	62.435	12 48 30.55
9	1.63629	1.31013	0.19614	1.43096	61.914	12 44 34.64
10	1.63697	1.31727	0.19666	1.43070	61.398	12 40 38.73
11	1.63761	1.32433	0.19718	1.43045	60.886	12 36 42.83
12	1.63819	1.33130	0.19769	1.43021	60.378	12 32 46.92
13	1.63872	1.33820	0.19820	1.42998	59.873	12 28 51.02
14	1.63919	1.34500	0.19871	1.42976	59.374	12 24 55.11
15	1.63961	1.35172	0.19922	1.42954	58.879	12 20 59.20
16	1.63997	1.35836	0.19972	1.42934	58.389	12 17 3.30
17	1.64028	1.36491	0.20022	1.42915	57.904	12 13 7.39
18	1.64054	1.37137	0.20071	1.42897	57.425	12 9 11.48
19	1.64075	1.37776	0.20120	1.42879	56.950	12 5 15.58
20	1.64090	1.38406	0.20169	1.42863	56.481	12 1 19.67
21	1.64099	1.39028	0.20218	1.42848	56.016	11 57 23.76
22	1.64104	1.39641	0.20267	1.42833	55.557	11 53 27.86
23	1.64102	1.40247	0.20316	1.42820	55.104	11 49 31.95
24	1.64095	1.40845	0.20365	1.42808	54.657	11 45 36.04
25	1.64083	1.41434	0.20414	1.42796	54.215	11 41 40.14
26	1.64065	1.42016	0.20463	1.42786	53.779	11 37 44.23
27	1.64041	1.42589	0.20512	1.42777	53.350	11 33 48.32
28	1.64013	1.43154	0.20561	1.42770	52.925	11 29 52.42
29	1.63979	1.43712	0.20610	1.42763	52.506	11 25 56.51
30	1.63939	1.44262	0.20659	1.42757	52.094	11 22 0.60
31	1.63894	1.44803	0.20709	1.42752	51.690	11 18 4.69



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .785249. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	+1 <sup>h</sup> .2442	−0 <sup>h</sup> .8590	+9 <sup>h</sup> .5506	+0 <sup>h</sup> .3271	2404307	162	243	•6653
2	1 <sup>h</sup> .2469	0 <sup>h</sup> .8390	9 <sup>h</sup> .5531	0 <sup>h</sup> .3229	2404308	163	244	•6681
3	1 <sup>h</sup> .2494	0 <sup>h</sup> .8180	9 <sup>h</sup> .5555	0 <sup>h</sup> .3188	2404309	164	245	•6708
4	+1 <sup>h</sup> .2518	−0 <sup>h</sup> .7957	+9 <sup>h</sup> .5578	+0 <sup>h</sup> .3148	2404310	165	246	•6735
5	1 <sup>h</sup> .2541	0 <sup>h</sup> .7721	9 <sup>h</sup> .5602	0 <sup>h</sup> .3108	2404311	166	247	•6763
6	1 <sup>h</sup> .2563	0 <sup>h</sup> .7470	9 <sup>h</sup> .5625	0 <sup>h</sup> .3069	2404312	167	248	•6790
7	+1 <sup>h</sup> .2583	−0 <sup>h</sup> .7202	+9 <sup>h</sup> .5648	+0 <sup>h</sup> .3030	2404313	168	249	•6817
8	1 <sup>h</sup> .2602	0 <sup>h</sup> .6915	9 <sup>h</sup> .5670	0 <sup>h</sup> .2993	2404314	169	250	•6845
9	1 <sup>h</sup> .2620	0 <sup>h</sup> .6606	9 <sup>h</sup> .5692	0 <sup>h</sup> .2956	2404315	170	251	•6872
10	+1 <sup>h</sup> .2636	−0 <sup>h</sup> .6272	+9 <sup>h</sup> .5714	+0 <sup>h</sup> .2920	2404316	171	252	•6900
11	1 <sup>h</sup> .2651	0 <sup>h</sup> .5908	9 <sup>h</sup> .5736	0 <sup>h</sup> .2886	2404317	172	253	•6927
12	1 <sup>h</sup> .2665	0 <sup>h</sup> .5510	9 <sup>h</sup> .5758	0 <sup>h</sup> .2852	2404318	173	254	•6954
13	+1 <sup>h</sup> .2677	−0 <sup>h</sup> .5069	+9 <sup>h</sup> .5779	+0 <sup>h</sup> .2820	2404319	174	255	•6982
14	1 <sup>h</sup> .2688	0 <sup>h</sup> .4577	9 <sup>h</sup> .5800	0 <sup>h</sup> .2788	2404320	175	256	•7009
15	1 <sup>h</sup> .2698	0 <sup>h</sup> .4021	9 <sup>h</sup> .5821	0 <sup>h</sup> .2758	2404321	176	257	•7036
16	+1 <sup>h</sup> .2707	−0 <sup>h</sup> .3381	+9 <sup>h</sup> .5842	+0 <sup>h</sup> .2729	2404322	177	258	•7064
17	1 <sup>h</sup> .2714	0 <sup>h</sup> .2627	9 <sup>h</sup> .5862	0 <sup>h</sup> .2701	2404323	178	259	•7091
18	1 <sup>h</sup> .2720	0 <sup>h</sup> .1713	9 <sup>h</sup> .5882	0 <sup>h</sup> .2674	2404324	179	260	•7119
19	+1 <sup>h</sup> .2725	−0 <sup>h</sup> .0551	+9 <sup>h</sup> .5903	+0 <sup>h</sup> .2649	2404325	180	261	•7146
20	1 <sup>h</sup> .2728	9 <sup>h</sup> .8957	9 <sup>h</sup> .5923	0 <sup>h</sup> .2625	2404326	181	262	•7173
21	1 <sup>h</sup> .2730	9 <sup>h</sup> .6407	9 <sup>h</sup> .5943	0 <sup>h</sup> .2603	2404327	182	263	•7201
22	+1 <sup>h</sup> .2731	−8 <sup>h</sup> .9426	+9 <sup>h</sup> .5962	+0 <sup>h</sup> .2582	2404328	183	264	•7228
23	1 <sup>h</sup> .2731	+9 <sup>h</sup> .4186	9 <sup>h</sup> .5982	0 <sup>h</sup> .2562	2404329	184	265	•7255
24	1 <sup>h</sup> .2729	9 <sup>h</sup> .7869	9 <sup>h</sup> .6002	0 <sup>h</sup> .2544	2404330	185	266	•7283
25	+1 <sup>h</sup> .2727	+9 <sup>h</sup> .9832	+9 <sup>h</sup> .6021	+0 <sup>h</sup> .2528	2404331	186	267	•7310
26	1 <sup>h</sup> .2722	0 <sup>h</sup> .1180	9 <sup>h</sup> .6041	0 <sup>h</sup> .2513	2404332	187	268	•7338
27	1 <sup>h</sup> .2717	0 <sup>h</sup> .2206	9 <sup>h</sup> .6060	0 <sup>h</sup> .2499	2404333	188	269	•7365
28	+1 <sup>h</sup> .2710	+0 <sup>h</sup> .3034	+9 <sup>h</sup> .6080	+0 <sup>h</sup> .2487	2404334	189	270	•7392
29	1 <sup>h</sup> .2702	0 <sup>h</sup> .3729	9 <sup>h</sup> .6099	0 <sup>h</sup> .2476	2404335	190	271	•7420
30	1 <sup>h</sup> .2693	0 <sup>h</sup> .4327	9 <sup>h</sup> .6119	0 <sup>h</sup> .2467	2404336	191	272	•7447
31	+1 <sup>h</sup> .2682	+0 <sup>h</sup> .4852	+9 <sup>h</sup> .6138	+0 <sup>h</sup> .2460	2404337	192	273	•7474

\* Add .0026 if Fraction be required for the time 1, see page 329.

\* Add .0026 if Fraction be required for the time t, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>m s</i>	<i>m s</i>	<i>s</i>
Sat.	1	12 29 43.53	9.059	S. 3 12 43.1	58.28	1 4 35	10 18.69	0.795
Sun.	2	12 33 21.08	9.071	3 36 0.8	58.18	1 4 40	10 37.63	0.783
Mon.	3	12 36 58.92	9.083	3 59 15.9	58.07	1 4 45	10 56.29	0.771
Tues.	4	12 40 37.07	9.097	4 22 28.1	57.94	1 4 50	11 14.65	0.758
Wed.	5	12 44 15.55	9.111	4 45 36.9	57.79	1 4 55	11 32.67	0.743
Thur.	6	12 47 54.40	9.126	5 8 42.2	57.64	1 4 61	11 50.33	0.728
Frid.	7	12 51 33.62	9.143	5 31 43.5	57.47	1 4 67	12 7.62	0.712
Sat.	8	12 55 13.24	9.160	5 54 40.6	57.28	1 4 73	12 24.50	0.694
Sun.	9	12 58 53.29	9.179	6 17 32.9	57.07	1 4 79	12 40.95	0.676
Mon.	10	13 2 33.81	9.198	6 40 20.3	56.86	1 4 86	12 56.95	0.657
Tues.	11	13 6 14.80	9.218	7 3 2.3	56.63	1 4 93	13 12.47	0.636
Wed.	12	13 9 56.28	9.239	7 25 38.6	56.39	1 5 01	13 27.50	0.616
Thur.	13	13 13 38.27	9.261	7 48 8.9	56.13	1 5 08	13 42.02	0.594
Frid.	14	13 17 20.81	9.284	8 10 32.8	55.85	1 5 16	13 56.00	0.571
Sat.	15	13 21 3.91	9.308	8 32 49.9	55.56	1 5 24	14 9.41	0.547
Sun.	16	13 24 47.59	9.332	8 54 59.9	55.26	1 5 32	14 22.25	0.523
Mon.	17	13 28 31.86	9.357	9 17 2.3	54.94	1 5 41	14 34.50	0.498
Tues.	18	13 32 16.74	9.383	9 38 56.9	54.60	1 5 50	14 46.14	0.472
Wed.	19	13 36 2.25	9.410	10 0 43.1	54.25	1 5 59	14 57.14	0.445
Thur.	20	13 39 48.42	9.437	10 22 20.7	53.88	1 5 68	15 7.51	0.418
Frid.	21	13 43 35.25	9.465	10 43 49.1	53.49	1 5 77	15 17.22	0.390
Sat.	22	13 47 22.75	9.493	11 5 8.1	53.09	1 5 87	15 26.25	0.362
Sun.	23	13 51 10.93	9.522	11 26 17.2	52.67	1 5 97	15 34.59	0.333
Mon.	24	13 54 59.82	9.552	11 47 16.0	52.23	1 6 07	15 42.23	0.304
Tues.	25	13 58 49.42	9.582	12 8 4.1	51.77	1 6 17	15 49.17	0.274
Wed.	26	14 2 39.74	9.612	12 28 41.0	51.30	1 6 28	15 55.39	0.244
Thur.	27	14 6 30.79	9.642	12 49 6.4	50.81	1 6 39	16 0.88	0.214
Frid.	28	14 10 22.57	9.673	13 9 19.7	50.30	1 6 50	16 5.64	0.183
Sat.	29	14 14 15.09	9.704	13 29 20.6	49.77	1 6 61	16 9.66	0.152
Sun.	30	14 18 8.37	9.736	13 49 8.6	49.22	1 6 72	16 12.93	0.120
Mon.	31	14 22 2.41	9.768	14 8 43.3	48.66	1 6 83	16 15.43	0.088
Tues.	32	14 25 57.22	9.800	S. 14 28 4.2	48.08	1 6 95	16 17.17	0.056

\* Mean Time of the Semidiameter passing may be found by subtracting 0<sup>s</sup>.18 from the *Sidereal* Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		h m s	° ' "	' "	m s	h m s
Sat.	1	12 29 45.09	S. 3 12 53.2	16 1.3	10 18.82	12 40 3.91
Sun.	2	12 33 22.69	3 36 11.1	16 1.6	10 37.77	12 44 0.46
Mon.	3	12 37 0.58	3 59 26.4	16 1.9	10 56.43	12 47 57.01
Tues.	4	12 40 38.78	4 22 38.9	16 2.2	11 14.79	12 51 53.57
Wed.	5	12 44 17.31	4 45 48.1	16 2.5	11 32.81	12 55 50.12
Thur.	6	12 47 56.20	5 8 53.6	16 2.8	11 50.47	12 59 46.67
Frid.	7	12 51 35.47	5 31 55.2	16 3.0	12 7.76	13 3 43.23
Sat.	8	12 55 15.14	5 54 52.4	16 3.3	12 24.64	13 7 39.78
Sun.	9	12 58 55.24	6 17 45.0	16 3.6	12 41.09	13 11 36.33
Mon.	10	13 2 35.80	6 40 32.6	16 3.9	12 57.09	13 15 32.89
Tues.	11	13 6 16.83	7 3 14.8	16 4.1	13 12.61	13 19 29.44
Wed.	12	13 9 58.35	7 25 51.3	16 4.4	13 27.64	13 23 25.99
Thur.	13	13 13 40.39	7 48 21.8	16 4.7	13 42.16	13 27 22.55
Frid.	14	13 17 22.97	8 10 45.8	16 5.0	13 56.13	13 31 19.10
Sat.	15	13 21 6.11	8 33 3.0	16 5.2	14 9.54	13 35 15.65
Sun.	16	13 24 49.83	8 55 13.1	16 5.5	14 22.38	13 39 12.21
Mon.	17	13 28 34.13	9 17 15.7	16 5.8	14 34.63	13 43 8.76
Tues.	18	13 32 19.05	9 39 10.3	16 6.0	14 46.26	13 47 5.31
Wed.	19	13 36 4.60	10 0 56.6	16 6.3	14 57.26	13 51 1.87
Thur.	20	13 39 50.80	10 22 34.3	16 6.6	15 7.62	13 54 58.42
Frid.	21	13 43 37.66	10 44 2.8	16 6.8	15 17.31	13 58 54.97
Sat.	22	13 47 25.19	11 5 21.8	16 7.1	15 26.34	14 2 51.53
Sun.	23	13 51 13.40	11 26 30.9	16 7.3	15 34.68	14 6 48.08
Mon.	24	13 55 2.32	11 47 29.7	16 7.6	15 42.31	14 10 44.63
Tues.	25	13 58 51.95	12 8 17.7	16 7.9	15 49.24	14 14 41.19
Wed.	26	14 2 42.29	12 28 54.6	16 8.1	15 55.45	14 18 37.74
Thur.	27	14 6 33.36	12 49 19.9	16 8.4	16 0.94	14 22 34.30
Frid.	28	14 10 25.16	13 9 33.2	16 8.7	16 5.69	14 26 30.85
Sat.	29	14 14 17.70	13 29 34.0	16 8.9	16 9.70	14 30 27.40
Sun.	30	14 18 11.00	13 49 21.9	16 9.2	16 12.96	14 34 23.96
Mon.	31	14 22 5.06	14 8 56.4	16 9.4	16 15.46	14 38 20.52
Tues.	32	14 25 59.88	S. 14 28 17.3	16 9.7	16 17.19	14 42 17.07

\* The Semidiameter for Apparent Noon may be assumed the same as that for Mean Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	188 5 57.6	N.0.13	0.0002168	15 59.3	15 53.4	58 34.6	58 13.0
2	189 5 3.0	0.00	0.0000889	15 47.6	15 41.9	57 51.6	57 30.7
3	190 4 10.1	S.0.13	9.9999610	15 36.3	15 31.0	57 10.4	56 50.9
4	191 3 18.9	0.24	9.9998332	15 25.9	15 21.2	56 32.4	56 14.9
5	192 2 29.4	0.34	9.9997057	15 16.7	15 12.4	55 58.4	55 42.9
6	193 1 41.8	0.42	9.9995786	15 8.5	15 4.8	55 28.5	55 15.0
7	194 0 56.1	0.48	9.9994520	15 1.4	14 58.3	55 2.6	54 51.2
8	195 0 12.3	0.51	9.9993260	14 55.5	14 52.9	54 40.8	54 31.4
9	195 59 30.5	0.52	9.9992008	14 50.6	14 48.7	54 23.1	54 15.8
10	196 58 50.7	0.49	9.9990763	14 47.0	14 45.7	54 9.8	54 5.0
11	197 58 13.1	0.45	9.9989525	14 44.8	14 44.2	54 1.5	53 59.5
12	198 57 37.7	0.39	9.9988294	14 44.1	14 44.4	53 59.1	54 0.4
13	199 57 4.4	0.31	9.9987070	14 45.3	14 46.7	54 3.5	54 8.5
14	200 56 33.4	0.20	9.9985853	14 48.6	14 51.1	54 15.6	54 24.8
15	201 56 4.7	S.0.09	9.9984643	14 54.2	14 58.0	54 36.3	54 50.0
16	202 55 38.3	N.0.02	9.9983440	15 2.4	15 7.4	55 6.1	55 24.5
17	203 55 14.1	0.14	9.9982242	15 13.0	15 19.2	55 45.1	56 7.9
18	204 54 52.2	0.27	9.9981049	15 26.0	15 33.2	56 32.6	56 59.0
19	205 54 32.5	0.38	9.9979860	15 40.8	15 48.6	57 26.8	57 55.5
20	206 54 15.1	0.48	9.9978675	15 56.6	16 4.5	58 24.7	58 53.8
21	207 54 0.0	0.57	9.9977493	16 12.3	16 19.6	59 22.2	59 49.0
22	208 53 47.0	0.62	9.9976312	16 26.3	16 32.3	60 13.7	60 35.4
23	209 53 36.1	0.64	9.9975131	16 37.2	16 41.0	60 53.6	61 7.5
24	210 53 27.3	0.61	9.9973949	16 43.6	16 44.8	61 16.8	61 21.2
25	211 53 20.6	0.56	9.9972768	16 44.6	16 43.0	61 20.5	61 14.8
26	212 53 15.8	0.47	9.9971588	16 40.2	16 36.2	61 4.4	60 49.7
27	213 53 12.8	0.35	9.9970410	16 31.1	16 25.2	60 31.3	60 9.8
28	214 53 11.5	0.22	9.9969234	16 18.7	16 11.7	59 45.8	59 20.2
29	215 53 11.9	N.0.08	9.9968062	16 4.4	15 57.0	58 53.5	58 26.4
30	216 53 13.9	S.0.05	9.9966897	15 49.7	15 42.5	57 59.5	57 33.1
31	217 53 17.4	0.17	9.9965740	15 35.6	15 29.0	57 7.7	56 43.5
32	218 53 22.4	S.0.28	9.9964594	15 22.8	15 17.0	56 20.8	55 59.7



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.								
		Longitude.		Latitude.		Age.	Meridian		Passage.
		Noon.	Midnight.	Noon.	Midnight.		Noon.		
Sat.	1	273° 9' 40".2	280° 0' 12".8	N. 1° 4' 9".2	N. 0° 28' 23".9	6.2	5	47.0	
Sun.	2	286° 45' 40".6	293° 26' 20".3	S. 0° 7' 19".0	S. 0° 42' 30".1	7.2	6	44.0	
Mon.	3	300° 2' 30".8	306° 34' 32".1	1° 16' 42".2	1° 49' 30".6	8.2	7	38.6	
Tues.	4	313° 2' 44".5	319° 27' 27".4	2° 20' 33".0	2° 49' 29".4	9.2	8	30.3	
Wed.	5	325° 48' 58".7	332° 7' 34".6	3° 16' 2".3	3° 39' 56".3	10.2	9	19.0	
Thur.	6	338° 23' 29".5	344° 36' 55".4	4° 0' 58".3	4° 18' 57".4	11.2	10	4.9	
Frid.	7	350° 48' 2".5	356° 56' 59".5	4° 33' 44".7	4° 45' 14".1	12.2	10	48.6	
Sat.	8	3° 3' 53".6	9° 8' 51".4	4° 53' 21".2	4° 58' 4".0	13.2	11	31.0	
Sun.	9	15° 11' 59".3	21° 13' 23".6	4° 59' 22".6	4° 57' 19".1	14.2	12	12.7	
Mon.	10	27° 13' 11".8	33° 11' 32".6	4° 51' 57".4	4° 43' 23".3	15.2	12	54.4	
Tues.	11	39° 8' 36".0	45° 4' 35".0	4° 31' 44".3	4° 17' 8".9	16.2	13	36.9	
Wed.	12	50° 59' 45".0	56° 54' 23".7	3° 59' 47".2	3° 39' 50".2	17.2	14	20.8	
Thur.	13	62° 48' 52".0	68° 43' 33".7	3° 17' 29".8	2° 52' 58".8	18.2	15	6.4	
Frid.	14	74° 38' 55".9	80° 35' 28".7	2° 26' 30".8	1° 58' 19".7	19.2	15	54.0	
Sat.	15	86° 33' 44".8	92° 34' 19".2	1° 28' 40".7	S. 0° 57' 49".6	20.2	16	43.4	
Sun.	16	98° 37' 49".4	104° 44' 53".8	S. 0° 26' 3".1	N. 0° 6' 21".4	21.2	17	34.5	
Mon.	17	110° 56' 12".1	117° 12' 23".9	N. 0° 39' 4".2	1° 11' 44".7	22.2	18	26.5	
Tues.	18	123° 34' 7".4	130° 1' 58".7	1° 44' 0".2	2° 15' 26".2	23.2	19	18.9	
Wed.	19	136° 36' 30".3	143° 18' 8".8	2° 45' 36".5	3° 14' 2".2	24.2	20	11.2	
Thur.	20	150° 7' 13".9	157° 3' 55".9	3° 40' 13".2	4° 3' 38".3	25.2	21	3.3	
Frid.	21	164° 8' 14".2	171° 19' 55".4	4° 23' 45".3	4° 40' 3".4	26.2	21	55.6	
Sat.	22	178° 38' 32".1	186° 3' 23".0	4° 52' 3".5	4° 59' 20".6	27.2	22	48.3	
Sun.	23	193° 33' 32".6	201° 7' 53".5	5° 1' 35".0	4° 58' 34".2	28.2	23	42.4	
Mon.	24	208° 45' 7".7	216° 23' 51".2	4° 50' 14".4	4° 36' 41".0	29.2		6	
Tues.	25	224° 2' 37".3	231° 40' 0".8	4° 18' 9".2	3° 55' 2".6	0.9	0	38.3	
Wed.	26	239° 14' 42".6	246° 45' 31".2	3° 27' 52".6	2° 57' 16".7	1.9	1	36.4	
Thur.	27	254° 11' 27".7	261° 31' 45".8	2° 23' 56".2	1° 48' 33".9	2.9	2	36.3	
Frid.	28	268° 45' 52".1	275° 53' 26".8	N. 1° 11' 53".1	N. 0° 34' 34".8	3.9	3	36.9	
Sat.	29	282° 54' 21".2	289° 48' 37".5	S. 0° 2' 42".5	S. 0° 39' 23".8	4.9	4	36.5	
Sun.	30	296° 36' 26".3	303° 18' 5".1	1° 14' 58".0	1° 48' 58".0	5.9	5	33.6	
Mon.	31	309° 53' 55".6	316° 24' 23".6	2° 21' 0".8	2° 50' 46".4	6.9	6	27.3	
Tues.	32	322° 49' 56".5	329° 11' 2".4	S. 3° 17' 58".4	S. 3° 42' 23".0	7.9	7	17.3	



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 1.</b>				<b>MONDAY 3.</b>			
0	18 13 40 <sup>s</sup> 22 <sup>m</sup>	S. 22 20 55 <sup>s</sup> 7 <sup>m</sup>	21 <sup>s</sup> 48 <sup>m</sup>	0	20 10 4 <sup>s</sup> 67 <sup>m</sup>	S. 21 24 15 <sup>s</sup> 3 <sup>m</sup>	42 <sup>s</sup> 94 <sup>m</sup>
1	18 16 9 <sup>s</sup> 32 <sup>m</sup>	22 23 0 <sup>s</sup> 3 <sup>m</sup>	20 <sup>s</sup> 04 <sup>m</sup>	1	20 12 24 <sup>s</sup> 88 <sup>m</sup>	21 19 54 <sup>s</sup> 1 <sup>m</sup>	44 <sup>s</sup> 11 <sup>m</sup>
2	18 18 38 <sup>s</sup> 34 <sup>m</sup>	22 24 56 <sup>s</sup> 2 <sup>m</sup>	18 <sup>s</sup> 60 <sup>m</sup>	2	20 14 44 <sup>s</sup> 83 <sup>m</sup>	21 15 26 <sup>s</sup> 0 <sup>m</sup>	45 <sup>s</sup> 28 <sup>m</sup>
3	18 21 7 <sup>s</sup> 27 <sup>m</sup>	22 26 43 <sup>s</sup> 5 <sup>m</sup>	17 <sup>s</sup> 17 <sup>m</sup>	3	20 17 4 <sup>s</sup> 50 <sup>m</sup>	21 10 50 <sup>s</sup> 8 <sup>m</sup>	46 <sup>s</sup> 44 <sup>m</sup>
4	18 23 36 <sup>s</sup> 11 <sup>m</sup>	22 28 22 <sup>s</sup> 2 <sup>m</sup>	15 <sup>s</sup> 73 <sup>m</sup>	4	20 19 23 <sup>s</sup> 91 <sup>m</sup>	21 6 8 <sup>s</sup> 7 <sup>m</sup>	47 <sup>s</sup> 58 <sup>m</sup>
5	18 26 4 <sup>s</sup> 85 <sup>m</sup>	22 29 52 <sup>s</sup> 2 <sup>m</sup>	14 <sup>s</sup> 29 <sup>m</sup>	5	20 21 43 <sup>s</sup> 04 <sup>m</sup>	21 1 19 <sup>s</sup> 8 <sup>m</sup>	48 <sup>s</sup> 72 <sup>m</sup>
6	18 28 33 <sup>s</sup> 49 <sup>m</sup>	22 31 13 <sup>s</sup> 7 <sup>m</sup>	12 <sup>s</sup> 86 <sup>m</sup>	6	20 24 1 <sup>s</sup> 89 <sup>m</sup>	20 56 24 <sup>s</sup> 1 <sup>m</sup>	49 <sup>s</sup> 85 <sup>m</sup>
7	18 31 2 <sup>s</sup> 02 <sup>m</sup>	22 32 26 <sup>s</sup> 5 <sup>m</sup>	11 <sup>s</sup> 43 <sup>m</sup>	7	20 26 20 <sup>s</sup> 47 <sup>m</sup>	20 51 21 <sup>s</sup> 6 <sup>m</sup>	50 <sup>s</sup> 97 <sup>m</sup>
8	18 33 30 <sup>s</sup> 44 <sup>m</sup>	22 33 30 <sup>s</sup> 7 <sup>m</sup>	9 <sup>s</sup> 99 <sup>m</sup>	8	20 28 38 <sup>s</sup> 77 <sup>m</sup>	20 46 12 <sup>s</sup> 5 <sup>m</sup>	52 <sup>s</sup> 08 <sup>m</sup>
9	18 35 58 <sup>s</sup> 74 <sup>m</sup>	22 34 26 <sup>s</sup> 4 <sup>m</sup>	8 <sup>s</sup> 57 <sup>m</sup>	9	20 30 56 <sup>s</sup> 78 <sup>m</sup>	20 40 56 <sup>s</sup> 7 <sup>m</sup>	53 <sup>s</sup> 18 <sup>m</sup>
10	18 38 26 <sup>s</sup> 92 <sup>m</sup>	22 35 13 <sup>s</sup> 6 <sup>m</sup>	7 <sup>s</sup> 15 <sup>m</sup>	10	20 33 14 <sup>s</sup> 52 <sup>m</sup>	20 35 34 <sup>s</sup> 3 <sup>m</sup>	54 <sup>s</sup> 27 <sup>m</sup>
11	18 40 54 <sup>s</sup> 98 <sup>m</sup>	22 35 52 <sup>s</sup> 2 <sup>m</sup>	5 <sup>s</sup> 72 <sup>m</sup>	11	20 35 31 <sup>s</sup> 97 <sup>m</sup>	20 30 5 <sup>s</sup> 4 <sup>m</sup>	55 <sup>s</sup> 36 <sup>m</sup>
12	18 43 22 <sup>s</sup> 90 <sup>m</sup>	22 36 22 <sup>s</sup> 2 <sup>m</sup>	4 <sup>s</sup> 30 <sup>m</sup>	12	20 37 49 <sup>s</sup> 13 <sup>m</sup>	20 24 30 <sup>s</sup> 0 <sup>m</sup>	56 <sup>s</sup> 43 <sup>m</sup>
13	18 45 50 <sup>s</sup> 69 <sup>m</sup>	22 36 43 <sup>s</sup> 8 <sup>m</sup>	2 <sup>s</sup> 89 <sup>m</sup>	13	20 40 6 <sup>s</sup> 01 <sup>m</sup>	20 18 48 <sup>s</sup> 2 <sup>m</sup>	57 <sup>s</sup> 49 <sup>m</sup>
14	18 48 18 <sup>s</sup> 33 <sup>m</sup>	22 36 56 <sup>s</sup> 9 <sup>m</sup>	1 <sup>s</sup> 48 <sup>m</sup>	14	20 42 22 <sup>s</sup> 60 <sup>m</sup>	20 13 0 <sup>s</sup> 1 <sup>m</sup>	58 <sup>s</sup> 55 <sup>m</sup>
15	18 50 45 <sup>s</sup> 83 <sup>m</sup>	22 37 1 <sup>s</sup> 6 <sup>m</sup>	0 <sup>s</sup> 07 <sup>m</sup>	15	20 44 38 <sup>s</sup> 90 <sup>m</sup>	20 7 5 <sup>s</sup> 6 <sup>m</sup>	59 <sup>s</sup> 60 <sup>m</sup>
16	18 53 13 <sup>s</sup> 18 <sup>m</sup>	22 36 57 <sup>s</sup> 8 <sup>m</sup>	1 <sup>s</sup> 33 <sup>m</sup>	16	20 46 54 <sup>s</sup> 92 <sup>m</sup>	20 1 4 <sup>s</sup> 9 <sup>m</sup>	60 <sup>s</sup> 63 <sup>m</sup>
17	18 55 40 <sup>s</sup> 38 <sup>m</sup>	22 36 45 <sup>s</sup> 7 <sup>m</sup>	2 <sup>s</sup> 72 <sup>m</sup>	17	20 49 10 <sup>s</sup> 64 <sup>m</sup>	19 54 58 <sup>s</sup> 0 <sup>m</sup>	61 <sup>s</sup> 66 <sup>m</sup>
18	18 58 7 <sup>s</sup> 42 <sup>m</sup>	22 36 25 <sup>s</sup> 2 <sup>m</sup>	4 <sup>s</sup> 11 <sup>m</sup>	18	20 51 26 <sup>s</sup> 08 <sup>m</sup>	19 48 45 <sup>s</sup> 0 <sup>m</sup>	62 <sup>s</sup> 67 <sup>m</sup>
19	19 0 34 <sup>s</sup> 29 <sup>m</sup>	22 35 56 <sup>s</sup> 4 <sup>m</sup>	5 <sup>s</sup> 50 <sup>m</sup>	19	20 53 41 <sup>s</sup> 22 <sup>m</sup>	19 42 26 <sup>s</sup> 0 <sup>m</sup>	63 <sup>s</sup> 67 <sup>m</sup>
20	19 3 1 <sup>s</sup> 00 <sup>m</sup>	22 35 19 <sup>s</sup> 2 <sup>m</sup>	6 <sup>s</sup> 88 <sup>m</sup>	20	20 55 56 <sup>s</sup> 07 <sup>m</sup>	19 36 0 <sup>s</sup> 9 <sup>m</sup>	64 <sup>s</sup> 67 <sup>m</sup>
21	19 5 27 <sup>s</sup> 53 <sup>m</sup>	22 34 33 <sup>s</sup> 8 <sup>m</sup>	8 <sup>s</sup> 26 <sup>m</sup>	21	20 58 10 <sup>s</sup> 63 <sup>m</sup>	19 29 29 <sup>s</sup> 9 <sup>m</sup>	65 <sup>s</sup> 66 <sup>m</sup>
22	19 7 53 <sup>s</sup> 89 <sup>m</sup>	22 33 40 <sup>s</sup> 1 <sup>m</sup>	9 <sup>s</sup> 63 <sup>m</sup>	22	21 0 24 <sup>s</sup> 89 <sup>m</sup>	19 22 53 <sup>s</sup> 0 <sup>m</sup>	66 <sup>s</sup> 63 <sup>m</sup>
23	19 10 20 <sup>s</sup> 06 <sup>m</sup>	S. 22 32 38 <sup>s</sup> 2 <sup>m</sup>	11 <sup>s</sup> 00 <sup>m</sup>	23	21 2 38 <sup>s</sup> 86 <sup>m</sup>	S. 19 16 10 <sup>s</sup> 3 <sup>m</sup>	67 <sup>s</sup> 60 <sup>m</sup>
<b>SUNDAY 2.</b>				<b>TUESDAY 4.</b>			
0	19 12 46 <sup>s</sup> 05 <sup>m</sup>	S. 22 31 28 <sup>s</sup> 1 <sup>m</sup>	12 <sup>s</sup> 36 <sup>m</sup>	0	21 4 52 <sup>s</sup> 54 <sup>m</sup>	S. 19 9 21 <sup>s</sup> 8 <sup>m</sup>	68 <sup>s</sup> 56 <sup>m</sup>
1	19 15 11 <sup>s</sup> 85 <sup>m</sup>	22 30 9 <sup>s</sup> 9 <sup>m</sup>	13 <sup>s</sup> 71 <sup>m</sup>	1	21 7 5 <sup>s</sup> 92 <sup>m</sup>	19 2 27 <sup>s</sup> 6 <sup>m</sup>	69 <sup>s</sup> 51 <sup>m</sup>
2	19 17 37 <sup>s</sup> 46 <sup>m</sup>	22 28 43 <sup>s</sup> 6 <sup>m</sup>	15 <sup>s</sup> 06 <sup>m</sup>	2	21 9 19 <sup>s</sup> 01 <sup>m</sup>	18 55 27 <sup>s</sup> 7 <sup>m</sup>	70 <sup>s</sup> 44 <sup>m</sup>
3	19 20 2 <sup>s</sup> 87 <sup>m</sup>	22 27 9 <sup>s</sup> 2 <sup>m</sup>	16 <sup>s</sup> 41 <sup>m</sup>	3	21 11 31 <sup>s</sup> 81 <sup>m</sup>	18 48 22 <sup>s</sup> 3 <sup>m</sup>	71 <sup>s</sup> 37 <sup>m</sup>
4	19 22 28 <sup>s</sup> 08 <sup>m</sup>	22 25 26 <sup>s</sup> 7 <sup>m</sup>	17 <sup>s</sup> 74 <sup>m</sup>	4	21 13 44 <sup>s</sup> 31 <sup>m</sup>	18 41 11 <sup>s</sup> 3 <sup>m</sup>	72 <sup>s</sup> 29 <sup>m</sup>
5	19 24 53 <sup>s</sup> 09 <sup>m</sup>	22 23 36 <sup>s</sup> 3 <sup>m</sup>	19 <sup>s</sup> 06 <sup>m</sup>	5	21 15 56 <sup>s</sup> 52 <sup>m</sup>	18 33 54 <sup>s</sup> 8 <sup>m</sup>	73 <sup>s</sup> 19 <sup>m</sup>
6	19 27 17 <sup>s</sup> 88 <sup>m</sup>	22 21 38 <sup>s</sup> 0 <sup>m</sup>	20 <sup>s</sup> 38 <sup>m</sup>	6	21 18 8 <sup>s</sup> 44 <sup>m</sup>	18 26 33 <sup>s</sup> 0 <sup>m</sup>	74 <sup>s</sup> 08 <sup>m</sup>
7	19 29 42 <sup>s</sup> 46 <sup>m</sup>	22 19 31 <sup>s</sup> 7 <sup>m</sup>	21 <sup>s</sup> 71 <sup>m</sup>	7	21 20 20 <sup>s</sup> 06 <sup>m</sup>	18 19 5 <sup>s</sup> 8 <sup>m</sup>	74 <sup>s</sup> 97 <sup>m</sup>
8	19 32 6 <sup>s</sup> 83 <sup>m</sup>	22 17 17 <sup>s</sup> 5 <sup>m</sup>	23 <sup>s</sup> 03 <sup>m</sup>	8	21 22 31 <sup>s</sup> 39 <sup>m</sup>	18 11 33 <sup>s</sup> 3 <sup>m</sup>	75 <sup>s</sup> 86 <sup>m</sup>
9	19 34 30 <sup>s</sup> 98 <sup>m</sup>	22 14 55 <sup>s</sup> 4 <sup>m</sup>	24 <sup>s</sup> 33 <sup>m</sup>	9	21 24 42 <sup>s</sup> 42 <sup>m</sup>	18 3 55 <sup>s</sup> 5 <sup>m</sup>	76 <sup>s</sup> 73 <sup>m</sup>
10	19 36 54 <sup>s</sup> 91 <sup>m</sup>	22 12 25 <sup>s</sup> 6 <sup>m</sup>	25 <sup>s</sup> 61 <sup>m</sup>	10	21 26 53 <sup>s</sup> 17 <sup>m</sup>	17 56 12 <sup>s</sup> 6 <sup>m</sup>	77 <sup>s</sup> 58 <sup>m</sup>
11	19 39 18 <sup>s</sup> 61 <sup>m</sup>	22 9 48 <sup>s</sup> 1 <sup>m</sup>	26 <sup>s</sup> 90 <sup>m</sup>	11	21 29 3 <sup>s</sup> 62 <sup>m</sup>	17 48 24 <sup>s</sup> 6 <sup>m</sup>	78 <sup>s</sup> 42 <sup>m</sup>
12	19 41 42 <sup>s</sup> 08 <sup>m</sup>	22 7 2 <sup>s</sup> 8 <sup>m</sup>	28 <sup>s</sup> 18 <sup>m</sup>	12	21 31 13 <sup>s</sup> 78 <sup>m</sup>	17 40 31 <sup>s</sup> 5 <sup>m</sup>	79 <sup>s</sup> 26 <sup>m</sup>
13	19 44 5 <sup>s</sup> 32 <sup>m</sup>	22 4 9 <sup>s</sup> 9 <sup>m</sup>	29 <sup>s</sup> 46 <sup>m</sup>	13	21 33 23 <sup>s</sup> 65 <sup>m</sup>	17 32 33 <sup>s</sup> 5 <sup>m</sup>	80 <sup>s</sup> 08 <sup>m</sup>
14	19 46 28 <sup>s</sup> 31 <sup>m</sup>	22 1 9 <sup>s</sup> 3 <sup>m</sup>	30 <sup>s</sup> 73 <sup>m</sup>	14	21 35 33 <sup>s</sup> 23 <sup>m</sup>	17 24 30 <sup>s</sup> 5 <sup>m</sup>	80 <sup>s</sup> 90 <sup>m</sup>
15	19 48 51 <sup>s</sup> 07 <sup>m</sup>	21 58 1 <sup>s</sup> 2 <sup>m</sup>	31 <sup>s</sup> 98 <sup>m</sup>	15	21 37 42 <sup>s</sup> 52 <sup>m</sup>	17 16 22 <sup>s</sup> 7 <sup>m</sup>	81 <sup>s</sup> 71 <sup>m</sup>
16	19 51 13 <sup>s</sup> 59 <sup>m</sup>	21 54 45 <sup>s</sup> 6 <sup>m</sup>	33 <sup>s</sup> 23 <sup>m</sup>	16	21 39 51 <sup>s</sup> 53 <sup>m</sup>	17 8 10 <sup>s</sup> 0 <sup>m</sup>	82 <sup>s</sup> 51 <sup>m</sup>
17	19 53 35 <sup>s</sup> 87 <sup>m</sup>	21 51 22 <sup>s</sup> 5 <sup>m</sup>	34 <sup>s</sup> 47 <sup>m</sup>	17	21 42 0 <sup>s</sup> 25 <sup>m</sup>	16 59 52 <sup>s</sup> 6 <sup>m</sup>	83 <sup>s</sup> 29 <sup>m</sup>
18	19 55 57 <sup>s</sup> 89 <sup>m</sup>	21 47 51 <sup>s</sup> 9 <sup>m</sup>	35 <sup>s</sup> 71 <sup>m</sup>	18	21 44 8 <sup>s</sup> 68 <sup>m</sup>	16 51 30 <sup>s</sup> 5 <sup>m</sup>	84 <sup>s</sup> 07 <sup>m</sup>
19	19 58 19 <sup>s</sup> 66 <sup>m</sup>	21 44 14 <sup>s</sup> 0 <sup>m</sup>	36 <sup>s</sup> 93 <sup>m</sup>	19	21 46 16 <sup>s</sup> 83 <sup>m</sup>	16 43 3 <sup>s</sup> 8 <sup>m</sup>	84 <sup>s</sup> 83 <sup>m</sup>
20	20 0 41 <sup>s</sup> 18 <sup>m</sup>	21 40 28 <sup>s</sup> 7 <sup>m</sup>	38 <sup>s</sup> 16 <sup>m</sup>	20	21 48 24 <sup>s</sup> 69 <sup>m</sup>	16 34 32 <sup>s</sup> 6 <sup>m</sup>	85 <sup>s</sup> 58 <sup>m</sup>
21	20 3 2 <sup>s</sup> 44 <sup>m</sup>	21 36 36 <sup>s</sup> 1 <sup>m</sup>	39 <sup>s</sup> 37 <sup>m</sup>	21	21 50 32 <sup>s</sup> 27 <sup>m</sup>	16 25 56 <sup>s</sup> 8 <sup>m</sup>	86 <sup>s</sup> 33 <sup>m</sup>
22	20 5 23 <sup>s</sup> 45 <sup>m</sup>	21 32 36 <sup>s</sup> 3 <sup>m</sup>	40 <sup>s</sup> 56 <sup>m</sup>	22	21 52 39 <sup>s</sup> 57 <sup>m</sup>	16 17 16 <sup>s</sup> 6 <sup>m</sup>	87 <sup>s</sup> 07 <sup>m</sup>
23	20 7 44 <sup>s</sup> 19 <sup>m</sup>	21 28 29 <sup>s</sup> 4 <sup>m</sup>	41 <sup>s</sup> 75 <sup>m</sup>	23	21 54 46 <sup>s</sup> 59 <sup>m</sup>	16 8 32 <sup>s</sup> 0 <sup>m</sup>	87 <sup>s</sup> 80 <sup>m</sup>
24	20 10 4 <sup>s</sup> 67 <sup>m</sup>	S. 21 24 15 <sup>s</sup> 3 <sup>m</sup>	42 <sup>s</sup> 94 <sup>m</sup>	24	21 56 53 <sup>s</sup> 33 <sup>m</sup>	S. 15 59 43 <sup>s</sup> 0 <sup>m</sup>	88 <sup>s</sup> 52 <sup>m</sup>



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>WEDNESDAY 5.</b>				<b>FRIDAY 7.</b>			
0	<sup>h</sup> 21 <sup>m</sup> 56 <sup>s</sup> 53.33	<sup>o</sup> 15 <sup>i</sup> 59 <sup>n</sup> 43.0	88.52	0	<sup>h</sup> 23 <sup>m</sup> 33 <sup>s</sup> 26.64	<sup>o</sup> 7 <sup>i</sup> 50 <sup>n</sup> 23.4	111.84
1	21 58 59.79	15 50 49.8	89.23	1	23 35 22.24	7 39 11.5	112.12
2	22 1 5.98	15 41 52.3	89.93	2	23 37 17.68	7 27 58.0	112.38
3	22 3 11.89	15 32 50.7	90.61	3	23 39 12.95	7 16 43.0	112.63
4	22 5 17.53	15 23 45.0	91.28	4	23 41 8.07	7 5 26.5	112.87
5	22 7 22.90	15 14 35.3	91.95	5	23 43 3.03	6 54 8.6	113.10
6	22 9 28.01	15 5 21.6	92.61	6	23 44 57.84	6 42 49.3	113.33
7	22 11 32.84	14 56 4.0	93.26	7	23 46 52.50	6 31 28.6	113.55
8	22 13 37.41	14 46 42.5	93.90	8	23 48 47.01	6 20 6.7	113.76
9	22 15 41.71	14 37 17.2	94.53	9	23 50 41.38	6 8 43.5	113.96
10	22 17 45.75	14 27 48.1	95.15	10	23 52 35.61	5 57 19.2	114.15
11	22 19 49.53	14 18 15.4	95.76	11	23 54 29.70	5 45 53.7	114.34
12	22 21 53.05	14 8 39.0	96.36	12	23 56 23.66	5 34 27.1	114.52
13	22 23 56.32	13 58 59.1	96.95	13	23 58 17.49	5 22 59.5	114.69
14	22 25 59.33	13 49 15.6	97.53	14	0 0 11.18	5 11 30.8	114.86
15	22 28 2.08	13 39 28.7	98.10	15	0 2 4.75	5 0 1.2	115.01
16	22 30 4.59	13 29 38.4	98.66	16	0 3 58.20	4 48 30.7	115.15
17	22 32 6.85	13 19 44.8	99.21	17	0 5 51.52	4 36 59.4	115.29
18	22 34 8.86	13 9 47.9	99.76	18	0 7 44.73	4 25 27.2	115.42
19	22 36 10.63	12 59 47.7	100.30	19	0 9 37.82	4 13 54.3	115.54
20	22 38 12.16	12 49 44.3	100.82	20	0 11 30.80	4 2 20.7	115.66
21	22 40 13.45	12 39 37.9	101.33	21	0 13 23.68	3 50 46.4	115.77
22	22 42 14.50	12 29 28.4	101.84	22	0 15 16.45	3 39 11.4	115.88
23	22 44 15.32	S. 12 19 15.8	102.34	23	0 17 9.11	S. 3 27 35.9	115.96
<b>THURSDAY 6.</b>				<b>SATURDAY 8.</b>			
0	22 46 15.90	S. 12 9 0.3	102.83	0	0 19 1.67	S. 3 15 59.9	116.04
1	22 48 16.25	11 58 41.9	103.30	1	0 20 54.14	3 4 23.4	116.12
2	22 50 16.37	11 48 20.7	103.77	2	0 22 46.52	2 52 46.4	116.20
3	22 52 16.27	11 37 56.7	104.23	3	0 24 38.80	2 41 9.0	116.26
4	22 54 15.95	11 27 29.9	104.68	4	0 26 31.00	2 29 31.3	116.31
5	22 56 15.41	11 17 0.5	105.12	5	0 28 23.11	2 17 53.3	116.35
6	22 58 14.65	11 6 28.5	105.56	6	0 30 15.14	2 6 15.1	116.39
7	23 0 13.67	10 55 53.8	105.98	7	0 32 7.09	1 54 36.6	116.43
8	23 2 12.48	10 45 16.7	106.39	8	0 33 58.97	1 42 57.9	116.45
9	23 4 11.08	10 34 37.1	106.80	9	0 35 50.77	1 31 19.2	116.47
10	23 6 9.47	10 23 55.1	107.20	10	0 37 42.50	1 19 40.3	116.48
11	23 8 7.65	10 13 10.7	107.58	11	0 39 34.16	1 8 1.4	116.48
12	23 10 5.64	10 2 24.1	107.96	12	0 41 25.76	0 56 22.6	116.47
13	23 12 3.42	9 51 35.2	108.33	13	0 43 17.30	0 44 43.8	116.46
14	23 14 1.01	9 40 44.1	108.70	14	0 45 8.78	0 33 5.1	116.44
15	23 15 58.40	9 29 50.8	109.05	15	0 47 0.21	0 21 26.5	116.42
16	23 17 55.60	9 18 55.5	109.39	16	0 48 51.58	S. 0 9 48.1	116.38
17	23 19 52.61	9 7 58.1	109.73	17	0 50 42.90	N. 0 1 50.1	116.34
18	23 21 49.44	8 56 58.7	110.07	18	0 52 34.18	0 13 28.0	116.29
19	23 23 46.08	8 45 57.3	110.38	19	0 54 25.41	0 25 5.6	116.23
20	23 25 42.54	8 34 54.1	110.69	20	0 56 16.60	0 36 42.8	116.17
21	23 27 38.83	8 23 49.0	110.99	21	0 58 7.75	0 48 19.6	116.09
22	23 29 34.94	8 12 42.2	111.28	22	0 59 58.87	0 59 55.9	116.02
23	23 31 30.87	8 1 33.6	111.57	23	1 1 49.96	1 11 31.8	115.93
24	23 33 26.64	S. 7 50 23.4	111.84	24	1 3 41.01	N. 1 23 7.1	115.84



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 9.</b>				<b>TUESDAY 11.</b>			
0	h m s 1 3 41.01	N. 1 23 7.1	115.84	0	h m s 2 32 51.47	N. 10 15 20.9	103.31
1	1 5 32.04	1 34 41.9	115.74	1	2 34 44.42	10 25 39.5	102.88
2	1 7 23.04	1 46 16.0	115.63	2	2 36 37.48	10 35 55.4	102.44
3	1 9 14.03	1 57 49.5	115.52	3	2 38 30.64	10 46 8.8	102.01
4	1 11 5.00	2 9 22.3	115.40	4	2 40 23.91	10 56 19.5	101.56
5	1 12 55.95	2 20 54.3	115.27	5	2 42 17.28	11 6 27.5	101.11
6	1 14 46.89	2 32 25.6	115.14	6	2 44 10.76	11 16 32.8	100.65
7	1 16 37.82	2 43 56.0	115.00	7	2 46 4.36	11 26 35.3	100.18
8	1 18 28.74	2 55 25.6	114.85	8	2 47 58.08	11 36 35.0	99.72
9	1 20 19.66	3 6 54.2	114.69	9	2 49 51.91	11 46 31.9	99.23
10	1 22 10.58	3 18 21.9	114.53	10	2 51 45.86	11 56 25.8	98.74
11	1 24 1.50	3 29 48.6	114.36	11	2 53 39.93	12 6 16.8	98.26
12	1 25 52.42	3 41 14.2	114.18	12	2 55 34.13	12 16 4.9	97.76
13	1 27 43.35	3 52 38.8	114.00	13	2 57 28.45	12 25 49.9	97.25
14	1 29 34.30	4 4 2.2	113.81	14	2 59 22.90	12 35 31.9	96.74
15	1 31 25.25	4 15 24.5	113.62	15	3 1 17.48	12 45 10.8	96.22
16	1 33 16.22	4 26 45.6	113.41	16	3 3 12.19	12 54 46.6	95.70
17	1 35 7.21	4 38 5.4	113.20	17	3 5 7.03	13 4 19.2	95.17
18	1 36 58.22	4 49 24.0	112.98	18	3 7 2.01	13 13 48.6	94.63
19	1 38 49.26	5 0 41.2	112.76	19	3 8 57.13	13 23 14.7	94.08
20	1 40 40.32	5 11 57.1	112.53	20	3 10 52.38	13 32 37.6	93.53
21	1 42 31.41	5 23 11.6	112.29	21	3 12 47.78	13 41 57.1	92.97
22	1 44 22.53	5 34 24.6	112.04	22	3 14 43.32	13 51 13.3	92.41
23	1 46 13.69	N. 5 45 36.1	111.79	23	3 16 39.00	N. 14 0 26.0	91.83
<b>MONDAY 10.</b>				<b>WEDNESDAY 12.</b>			
0	1 48 4.88	N. 5 56 46.1	111.53	0	3 18 34.83	N. 14 9 35.3	91.26
1	1 49 56.11	6 7 54.5	111.27	1	3 20 30.81	14 18 41.1	90.68
2	1 51 47.39	6 19 1.3	111.00	2	3 22 26.93	14 27 43.4	90.08
3	1 53 38.72	6 30 6.5	110.72	3	3 24 23.21	14 36 42.1	89.48
4	1 55 30.09	6 41 9.9	110.43	4	3 26 19.64	14 45 37.2	88.88
5	1 57 21.51	6 52 11.6	110.14	5	3 28 16.23	14 54 28.7	88.27
6	1 59 12.98	7 3 11.6	109.84	6	3 30 12.97	15 3 16.5	87.66
7	2 1 4.51	7 14 9.7	109.53	7	3 32 9.87	15 12 0.6	87.03
8	2 2 56.10	7 25 6.0	109.22	8	3 34 6.92	15 20 40.9	86.40
9	2 4 47.75	7 36 0.4	108.90	9	3 36 4.14	15 29 17.4	85.76
10	2 6 39.46	7 46 52.8	108.57	10	3 38 1.52	15 37 50.0	85.12
11	2 8 31.24	7 57 43.3	108.24	11	3 39 59.06	15 46 18.8	84.47
12	2 10 23.09	8 8 31.7	107.90	12	3 41 56.77	15 54 43.7	83.82
13	2 12 15.01	8 19 18.1	107.56	13	3 43 54.64	16 3 4.6	83.15
14	2 14 7.00	8 30 2.4	107.20	14	3 45 52.68	16 11 21.5	82.48
15	2 15 59.07	8 40 44.5	106.83	15	3 47 50.89	16 19 34.4	81.81
16	2 17 51.21	8 51 24.4	106.47	16	3 49 49.27	16 27 43.2	81.13
17	2 19 43.44	9 2 2.2	106.11	17	3 51 47.82	16 35 47.9	80.43
18	2 21 35.75	9 12 37.7	105.72	18	3 53 46.54	16 43 48.4	79.74
19	2 23 28.14	9 23 10.8	105.33	19	3 55 45.44	16 51 44.8	79.04
20	2 25 20.63	9 33 41.7	104.95	20	3 57 44.51	16 59 36.9	78.33
21	2 27 13.20	9 44 10.2	104.54	21	3 59 43.76	17 7 24.8	77.62
22	2 29 5.86	9 54 36.2	104.13	22	4 1 43.19	17 15 8.4	76.90
23	2 30 58.62	10 4 59.8	103.72	23	4 3 42.79	17 22 47.6	76.17
24	2 32 51.47	N. 10 15 20.9	103.31	24	4 5 42.58	N. 17 30 22.4	75.43



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 13.</b>				<b>SATURDAY 15.</b>			
0	4 5 42.58	N.17 30 22.4	75.43	0	5 45 10.82	N.21 56 0.0	32.94
1	4 7 42.54	17 37 52.8	74.69	1	5 47 19.66	21 59 14.6	31.92
2	4 9 42.69	17 45 18.7	73.95	2	5 49 28.67	22 2 23.0	30.88
3	4 11 43.01	17 52 40.2	73.20	3	5 51 37.85	22 5 25.2	29.84
4	4 13 43.52	17 59 57.1	72.43	4	5 53 47.20	22 8 21.1	28.80
5	4 15 44.21	18 7 9.4	71.67	5	5 55 56.72	22 11 10.8	27.76
6	4 17 45.08	18 14 17.1	70.89	6	5 58 6.40	22 13 54.2	26.71
7	4 19 46.14	18 21 20.1	70.12	7	6 0 16.25	22 16 31.3	25.65
8	4 21 47.38	18 28 18.5	69.33	8	6 2 26.27	22 19 2.0	24.59
9	4 23 48.81	18 35 12.1	68.53	9	6 4 36.44	22 21 26.4	23.52
10	4 25 50.43	18 42 0.9	67.73	10	6 6 46.77	22 23 44.3	22.45
11	4 27 52.23	18 48 44.9	66.93	11	6 8 57.27	22 25 55.8	21.38
12	4 29 54.21	18 55 24.1	66.12	12	6 11 7.92	22 28 0.8	20.30
13	4 31 56.39	19 1 58.4	65.31	13	6 13 18.72	22 29 59.4	19.22
14	4 33 58.75	19 8 27.8	64.48	14	6 15 29.68	22 31 51.4	18.13
15	4 36 1.30	19 14 52.2	63.66	15	6 17 40.80	22 33 36.9	17.03
16	4 38 4.04	19 21 11.7	62.82	16	6 19 52.06	22 35 15.8	15.94
17	4 40 6.97	19 27 26.1	61.98	17	6 22 3.47	22 36 48.2	14.84
18	4 42 10.09	19 33 35.4	61.13	18	6 24 15.03	22 38 13.9	13.73
19	4 44 13.40	19 39 39.7	60.28	19	6 26 26.73	22 39 33.0	12.62
20	4 46 16.89	19 45 38.8	59.42	20	6 28 38.57	22 40 45.4	11.51
21	4 48 20.58	19 51 32.7	58.55	21	6 30 50.55	22 41 51.1	10.39
22	4 50 24.46	19 57 21.4	57.68	22	6 33 2.67	22 42 50.1	9.27
23	4 52 28.52	N.20 3 4.8	56.80	23	6 35 14.93	N.22 43 42.3	8.14
<b>FRIDAY 14.</b>				<b>SUNDAY 16.</b>			
0	4 54 32.78	N.20 8 43.0	55.92	0	6 37 27.33	N.22 44 27.8	7.02
1	4 56 37.22	20 14 15.9	55.03	1	6 39 39.86	22 45 6.5	5.89
2	4 58 41.86	20 19 43.3	54.13	2	6 41 52.51	22 45 38.5	4.76
3	5 0 46.68	20 25 5.4	53.23	3	6 44 5.29	22 46 3.6	3.62
4	5 2 51.69	20 30 22.1	52.32	4	6 46 18.20	22 46 21.9	2.48
5	5 4 56.89	20 35 33.3	51.40	5	6 48 31.23	22 46 33.3	1.33
6	5 7 2.28	20 40 38.9	50.48	6	6 50 44.39	22 46 37.8	0.18
7	5 9 7.86	20 45 39.0	49.56	7	6 52 57.66	22 46 35.4	0.97
8	5 11 13.62	20 50 33.6	48.63	8	6 55 11.05	22 46 26.1	2.12
9	5 13 19.57	20 55 22.5	47.68	9	6 57 24.55	22 46 9.9	3.28
10	5 15 25.71	21 0 5.8	46.74	10	6 59 38.16	22 45 46.7	4.44
11	5 17 32.04	21 4 43.4	45.79	11	7 1 51.89	22 45 16.6	5.61
12	5 19 38.55	21 9 15.3	44.84	12	7 4 5.72	22 44 39.4	6.78
13	5 21 45.24	21 13 41.4	43.88	13	7 6 19.66	22 43 55.2	7.95
14	5 23 52.12	21 18 1.8	42.92	14	7 8 33.70	22 43 4.0	9.12
15	5 25 59.19	21 22 16.4	41.93	15	7 10 47.84	22 42 5.8	10.29
16	5 28 6.43	21 26 25.0	40.95	16	7 13 2.08	22 41 0.5	11.47
17	5 30 13.86	21 30 27.8	39.97	17	7 15 16.42	22 39 48.2	12.64
18	5 32 21.46	21 34 24.7	38.99	18	7 17 30.85	22 38 28.8	13.83
19	5 34 29.25	21 38 15.7	37.99	19	7 19 45.38	22 37 2.3	15.02
20	5 36 37.21	21 42 0.6	36.99	20	7 21 59.99	22 35 28.6	16.20
21	5 38 45.35	21 45 39.6	35.99	21	7 24 14.68	22 33 47.9	17.38
22	5 40 53.67	21 49 12.5	34.98	22	7 26 29.46	22 32 0.1	18.57
23	5 43 2.16	21 52 39.3	33.96	23	7 28 44.33	22 30 5.1	19.77
24	5 45 10.82	N.21 56 0.0	32.94	24	7 30 59.27	N.22 28 2.9	20.96



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 17.</b>				<b>WEDNESDAY 19.</b>			
0	<sup>h</sup> 7 <sup>m</sup> 30 <sup>s</sup> 59 <sup>.27</sup>	N.22 28 2 <sup>.9</sup>	20 <sup>.96</sup>	0	<sup>h</sup> 9 <sup>m</sup> 19 <sup>s</sup> 45 <sup>.89</sup>	N.18 29 59 <sup>.5</sup>	77 <sup>.72</sup>
1	7 33 14 <sup>.29</sup>	22 25 53 <sup>.6</sup>	22 <sup>.14</sup>	1	9 22 2 <sup>.12</sup>	18 22 9 <sup>.8</sup>	78 <sup>.85</sup>
2	7 35 29 <sup>.39</sup>	22 23 37 <sup>.2</sup>	23 <sup>.33</sup>	2	9 24 18 <sup>.33</sup>	18 14 13 <sup>.3</sup>	79 <sup>.97</sup>
3	7 37 44 <sup>.55</sup>	22 21 13 <sup>.6</sup>	24 <sup>.53</sup>	3	9 26 34 <sup>.52</sup>	18 6 10 <sup>.1</sup>	81 <sup>.09</sup>
4	7 39 59 <sup>.79</sup>	22 18 42 <sup>.8</sup>	25 <sup>.73</sup>	4	9 28 50 <sup>.70</sup>	17 58 0 <sup>.2</sup>	82 <sup>.20</sup>
5	7 42 15 <sup>.09</sup>	22 16 4 <sup>.8</sup>	26 <sup>.93</sup>	5	9 31 6 <sup>.87</sup>	17 49 43 <sup>.7</sup>	83 <sup>.31</sup>
6	7 44 30 <sup>.46</sup>	22 13 19 <sup>.7</sup>	28 <sup>.13</sup>	6	9 33 23 <sup>.02</sup>	17 41 20 <sup>.5</sup>	84 <sup>.42</sup>
7	7 46 45 <sup>.89</sup>	22 10 27 <sup>.3</sup>	29 <sup>.33</sup>	7	9 35 39 <sup>.16</sup>	17 32 50 <sup>.7</sup>	85 <sup>.51</sup>
8	7 49 1 <sup>.38</sup>	22 7 27 <sup>.8</sup>	30 <sup>.53</sup>	8	9 37 55 <sup>.27</sup>	17 24 14 <sup>.4</sup>	86 <sup>.59</sup>
9	7 51 16 <sup>.93</sup>	22 4 21 <sup>.0</sup>	31 <sup>.73</sup>	9	9 40 11 <sup>.37</sup>	17 15 31 <sup>.6</sup>	87 <sup>.68</sup>
10	7 53 32 <sup>.53</sup>	22 1 7 <sup>.0</sup>	32 <sup>.93</sup>	10	9 42 27 <sup>.45</sup>	17 6 42 <sup>.2</sup>	88 <sup>.77</sup>
11	7 55 48 <sup>.19</sup>	21 57 45 <sup>.9</sup>	34 <sup>.13</sup>	11	9 44 43 <sup>.51</sup>	16 57 46 <sup>.3</sup>	89 <sup>.84</sup>
12	7 58 3 <sup>.89</sup>	21 54 17 <sup>.5</sup>	35 <sup>.33</sup>	12	9 46 59 <sup>.55</sup>	16 48 44 <sup>.1</sup>	90 <sup>.91</sup>
13	8 0 19 <sup>.65</sup>	21 50 41 <sup>.9</sup>	36 <sup>.53</sup>	13	9 49 15 <sup>.57</sup>	16 39 35 <sup>.4</sup>	91 <sup>.97</sup>
14	8 2 35 <sup>.45</sup>	21 46 59 <sup>.2</sup>	37 <sup>.73</sup>	14	9 51 31 <sup>.57</sup>	16 30 20 <sup>.4</sup>	93 <sup>.03</sup>
15	8 4 51 <sup>.30</sup>	21 43 9 <sup>.2</sup>	38 <sup>.93</sup>	15	9 53 47 <sup>.56</sup>	16 20 59 <sup>.0</sup>	94 <sup>.08</sup>
16	8 7 7 <sup>.18</sup>	21 39 12 <sup>.0</sup>	40 <sup>.13</sup>	16	9 56 3 <sup>.52</sup>	16 11 31 <sup>.4</sup>	95 <sup>.12</sup>
17	8 9 23 <sup>.11</sup>	21 35 7 <sup>.6</sup>	41 <sup>.33</sup>	17	9 58 19 <sup>.46</sup>	16 1 57 <sup>.6</sup>	96 <sup>.16</sup>
18	8 11 39 <sup>.08</sup>	21 30 56 <sup>.0</sup>	42 <sup>.53</sup>	18	10 0 35 <sup>.39</sup>	15 52 17 <sup>.5</sup>	97 <sup>.20</sup>
19	8 13 55 <sup>.08</sup>	21 26 37 <sup>.2</sup>	43 <sup>.74</sup>	19	10 2 51 <sup>.29</sup>	15 42 31 <sup>.2</sup>	98 <sup>.22</sup>
20	8 16 11 <sup>.11</sup>	21 22 11 <sup>.1</sup>	44 <sup>.94</sup>	20	10 5 7 <sup>.17</sup>	15 32 38 <sup>.8</sup>	99 <sup>.23</sup>
21	8 18 27 <sup>.17</sup>	21 17 37 <sup>.9</sup>	46 <sup>.13</sup>	21	10 7 23 <sup>.04</sup>	15 22 40 <sup>.4</sup>	100 <sup>.24</sup>
22	8 20 43 <sup>.27</sup>	21 12 57 <sup>.6</sup>	47 <sup>.33</sup>	22	10 9 38 <sup>.89</sup>	15 12 35 <sup>.9</sup>	101 <sup>.25</sup>
23	8 22 59 <sup>.39</sup>	N.21 8 10 <sup>.0</sup>	48 <sup>.53</sup>	23	10 11 54 <sup>.72</sup>	N.15 2 25 <sup>.4</sup>	102 <sup>.25</sup>
<b>TUESDAY 18.</b>				<b>THURSDAY 20.</b>			
0	8 25 15 <sup>.53</sup>	N.21 3 15 <sup>.2</sup>	49 <sup>.73</sup>	0	10 14 10 <sup>.53</sup>	N.14 52 8 <sup>.9</sup>	103 <sup>.23</sup>
1	8 27 31 <sup>.70</sup>	20 58 13 <sup>.3</sup>	50 <sup>.92</sup>	1	10 16 26 <sup>.32</sup>	14 41 46 <sup>.6</sup>	104 <sup>.21</sup>
2	8 29 47 <sup>.88</sup>	20 53 4 <sup>.2</sup>	52 <sup>.11</sup>	2	10 18 42 <sup>.09</sup>	14 31 18 <sup>.4</sup>	105 <sup>.19</sup>
3	8 32 4 <sup>.09</sup>	20 47 48 <sup>.0</sup>	53 <sup>.29</sup>	3	10 20 57 <sup>.85</sup>	14 20 44 <sup>.3</sup>	106 <sup>.16</sup>
4	8 34 20 <sup>.31</sup>	20 42 24 <sup>.7</sup>	54 <sup>.48</sup>	4	10 23 13 <sup>.59</sup>	14 10 4 <sup>.5</sup>	107 <sup>.11</sup>
5	8 36 36 <sup>.55</sup>	20 36 54 <sup>.2</sup>	55 <sup>.67</sup>	5	10 25 29 <sup>.31</sup>	13 59 19 <sup>.0</sup>	108 <sup>.06</sup>
6	8 38 52 <sup>.80</sup>	20 31 16 <sup>.6</sup>	56 <sup>.86</sup>	6	10 27 45 <sup>.01</sup>	13 48 27 <sup>.8</sup>	109 <sup>.00</sup>
7	8 41 9 <sup>.07</sup>	20 25 31 <sup>.9</sup>	58 <sup>.05</sup>	7	10 30 0 <sup>.70</sup>	13 37 31 <sup>.0</sup>	109 <sup>.93</sup>
8	8 43 25 <sup>.34</sup>	20 19 40 <sup>.0</sup>	59 <sup>.23</sup>	8	10 32 16 <sup>.38</sup>	13 26 28 <sup>.6</sup>	110 <sup>.86</sup>
9	8 45 41 <sup>.62</sup>	20 13 41 <sup>.1</sup>	60 <sup>.40</sup>	9	10 34 32 <sup>.05</sup>	13 15 20 <sup>.7</sup>	111 <sup>.77</sup>
10	8 47 57 <sup>.91</sup>	20 7 35 <sup>.2</sup>	61 <sup>.58</sup>	10	10 36 47 <sup>.70</sup>	13 4 7 <sup>.4</sup>	112 <sup>.68</sup>
11	8 50 14 <sup>.21</sup>	20 1 22 <sup>.2</sup>	62 <sup>.76</sup>	11	10 39 3 <sup>.34</sup>	12 52 48 <sup>.6</sup>	113 <sup>.58</sup>
12	8 52 30 <sup>.51</sup>	19 55 2 <sup>.1</sup>	63 <sup>.93</sup>	12	10 41 18 <sup>.97</sup>	12 41 24 <sup>.4</sup>	114 <sup>.47</sup>
13	8 54 46 <sup>.81</sup>	19 48 35 <sup>.0</sup>	65 <sup>.09</sup>	13	10 43 34 <sup>.59</sup>	12 29 54 <sup>.9</sup>	115 <sup>.35</sup>
14	8 57 3 <sup>.11</sup>	19 42 1 <sup>.0</sup>	66 <sup>.26</sup>	14	10 45 50 <sup>.20</sup>	12 18 20 <sup>.2</sup>	116 <sup>.22</sup>
15	8 59 19 <sup>.42</sup>	19 35 19 <sup>.9</sup>	67 <sup>.42</sup>	15	10 48 5 <sup>.81</sup>	12 6 40 <sup>.3</sup>	117 <sup>.08</sup>
16	9 1 35 <sup>.72</sup>	19 28 31 <sup>.9</sup>	68 <sup>.58</sup>	16	10 50 21 <sup>.41</sup>	11 54 55 <sup>.3</sup>	117 <sup>.93</sup>
17	9 3 52 <sup>.01</sup>	19 21 37 <sup>.0</sup>	69 <sup>.73</sup>	17	10 52 37 <sup>.00</sup>	11 43 5 <sup>.2</sup>	118 <sup>.77</sup>
18	9 6 8 <sup>.30</sup>	19 14 35 <sup>.1</sup>	70 <sup>.89</sup>	18	10 54 52 <sup>.60</sup>	11 31 10 <sup>.1</sup>	119 <sup>.60</sup>
19	9 8 24 <sup>.59</sup>	19 7 26 <sup>.3</sup>	72 <sup>.04</sup>	19	10 57 8 <sup>.19</sup>	11 19 10 <sup>.0</sup>	120 <sup>.42</sup>
20	9 10 40 <sup>.87</sup>	19 0 10 <sup>.6</sup>	73 <sup>.18</sup>	20	10 59 23 <sup>.78</sup>	11 7 5 <sup>.1</sup>	121 <sup>.23</sup>
21	9 12 57 <sup>.14</sup>	18 52 48 <sup>.1</sup>	74 <sup>.33</sup>	21	11 1 39 <sup>.37</sup>	10 54 55 <sup>.3</sup>	122 <sup>.03</sup>
22	9 15 13 <sup>.40</sup>	18 45 18 <sup>.7</sup>	75 <sup>.47</sup>	22	11 3 54 <sup>.96</sup>	10 42 40 <sup>.8</sup>	122 <sup>.81</sup>
23	9 17 29 <sup>.65</sup>	18 37 42 <sup>.5</sup>	76 <sup>.60</sup>	23	11 6 10 <sup>.56</sup>	10 30 21 <sup>.6</sup>	123 <sup>.59</sup>
24	9 19 45 <sup>.89</sup>	N.18 29 59 <sup>.5</sup>	77 <sup>.72</sup>	24	11 8 26 <sup>.17</sup>	N.10 17 57 <sup>.7</sup>	124 <sup>.36</sup>



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 21.</b>				<b>SUNDAY 23.</b>			
0	h m s	N. 10 17 57.7	124.36	0	h m s	S. 0 43 15.9	145.62
1	11 10 41.78	10 5 29.3	125.12	1	13 0 0.97	0 57 49.8	145.68
2	11 12 57.40	9 52 56.3	125.87	2	13 2 19.65	1 32 24.1	145.73
3	11 15 13.03	9 40 18.9	126.59	3	13 4 38.46	1 26 58.6	145.77
4	11 17 28.68	9 27 37.2	127.32	4	13 6 57.40	1 41 33.3	145.78
5	11 19 44.34	9 14 51.1	128.03	5	13 9 16.47	1 56 8.0	145.77
6	11 22 0.01	9 2 0.8	128.73	6	13 11 35.68	2 10 42.6	145.75
7	11 24 15.70	8 49 6.4	129.41	7	13 13 55.03	2 25 17.0	145.70
8	11 26 31.42	8 36 7.9	129.09	8	13 16 14.51	2 39 51.0	145.64
9	11 28 47.15	8 23 5.3	130.76	9	13 18 34.13	2 54 24.7	145.57
10	11 31 2.91	8 9 58.8	131.41	10	13 20 53.90	3 8 57.9	145.48
11	11 33 18.70	7 56 48.4	132.04	11	13 23 13.82	3 23 30.4	145.36
12	11 35 34.51	7 43 34.3	132.67	12	13 25 33.89	3 38 2.2	145.23
13	11 37 50.35	7 30 16.4	133.28	13	13 27 54.11	3 52 33.1	145.08
14	11 40 6.23	7 16 54.9	133.88	14	13 30 14.48	4 7 3.1	144.91
15	11 42 22.14	7 3 29.9	134.46	15	13 32 35.01	4 21 32.0	144.72
16	11 44 38.08	6 50 1.4	135.04	16	13 34 55.70	4 35 59.8	144.51
17	11 46 54.07	6 36 29.4	135.60	17	13 37 16.55	4 50 26.2	144.28
18	11 49 10.09	6 22 54.2	136.14	18	13 39 37.56	5 4 51.2	144.05
19	11 51 26.16	6 9 15.7	136.68	19	13 41 58.75	5 19 14.8	143.79
20	11 53 42.28	5 55 34.0	137.20	20	13 44 20.10	5 33 36.7	143.50
21	11 55 58.44	5 41 49.3	137.70	21	13 46 41.62	5 47 56.8	143.20
22	11 58 14.66	5 28 1.6	138.19	22	13 49 3.31	6 2 15.1	142.89
23	12 0 30.93	N. 5 14 11.0	138.67	23	13 51 25.18	S. 6 16 31.5	142.55
<b>SATURDAY 22.</b>				<b>MONDAY 24.</b>			
0	12 2 47.25	N. 5 0 17.5	139.14	0	13 53 47.22	S. 6 30 45.7	142.19
1	12 5 3.63	4 46 21.3	139.58	1	13 56 9.44	6 44 57.8	141.82
2	12 7 20.08	4 32 22.5	140.02	2	13 58 31.84	6 59 7.6	141.43
3	12 9 36.58	4 18 21.1	140.44	3	14 0 54.42	7 13 14.9	141.02
4	12 11 53.15	4 4 17.2	140.84	4	14 3 17.19	7 27 19.8	140.59
5	12 14 9.79	3 50 11.0	141.23	5	14 5 40.15	7 41 22.0	140.13
6	12 16 26.50	3 36 2.4	141.61	6	14 8 3.29	7 55 21.4	139.67
7	12 18 43.29	3 21 51.7	141.97	7	14 10 26.62	8 9 18.0	139.18
8	12 21 0.15	3 7 38.8	142.32	8	14 12 50.14	8 23 11.6	138.67
9	12 23 17.09	2 53 23.9	142.64	9	14 15 13.86	8 37 2.1	138.15
10	12 25 34.11	2 39 7.1	142.95	10	14 17 37.77	8 50 49.4	137.61
11	12 27 51.21	2 24 48.5	143.25	11	14 20 1.87	9 4 33.4	137.04
12	12 30 8.40	2 10 28.1	143.53	12	14 22 26.17	9 18 13.9	136.46
13	12 32 25.68	1 56 6.1	143.79	13	14 24 50.67	9 31 50.9	135.86
14	12 34 43.05	1 41 42.6	144.04	14	14 27 15.36	9 45 24.2	135.24
15	12 37 0.52	1 27 17.6	144.27	15	14 29 40.26	9 58 53.8	134.61
16	12 39 18.08	1 12 51.3	144.49	16	14 32 5.35	10 12 19.5	133.95
17	12 41 35.75	0 58 23.7	144.69	17	14 34 30.65	10 25 41.2	133.27
18	12 43 53.51	0 43 55.0	144.87	18	14 36 56.15	10 38 58.8	132.57
19	12 46 11.38	0 29 25.2	145.04	19	14 39 21.85	10 52 12.1	131.86
20	12 48 29.36	0 14 54.5	145.19	20	14 41 47.76	11 5 21.1	131.13
21	12 50 47.45	N. 0 0 22.9	145.32	21	14 44 13.87	11 18 25.7	130.39
22	12 53 5.66	S. 0 14 9.4	145.44	22	14 46 40.18	11 31 25.8	129.63
23	12 55 23.98	0 28 42.4	145.54	23	14 49 6.70	11 44 21.2	128.83
24	12 57 42.41	S. 0 43 15.9	145.62	24	14 51 33.42	S. 11 57 11.8	128.03



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>TUESDAY 25.</b>				<b>THURSDAY 27.</b>			
0	h m s 14 51 33.42	S. 11 57 11.8	128.03	0	h m s 16 52 35.36	S. 20 8 9.0	71.16
1	14 54 0.35	12 9 57.6	127.21	1	16 55 10.16	20 15 11.5	69.68
2	14 56 27.48	12 22 38.3	126.37	2	16 57 45.04	20 22 5.2	68.20
3	14 58 54.82	12 35 14.0	125.52	3	17 0 19.98	20 28 49.9	66.70
4	15 1 22.36	12 47 44.5	124.64	4	17 2 54.99	20 35 25.6	65.20
5	15 3 50.11	13 0 9.7	123.75	5	17 5 30.06	20 41 52.3	63.70
6	15 6 18.06	13 12 29.5	122.84	6	17 8 5.18	20 48 10.0	62.19
7	15 8 46.22	13 24 43.8	121.91	7	17 10 40.35	20 54 18.6	60.67
8	15 11 14.58	13 36 52.4	120.97	8	17 13 15.56	21 0 18.0	59.13
9	15 13 43.15	13 48 55.4	120.01	9	17 15 50.80	21 6 8.2	57.61
10	15 16 11.91	14 0 52.5	119.02	10	17 18 26.08	21 11 49.3	56.08
11	15 18 40.88	14 12 43.7	118.03	11	17 21 1.38	21 17 21.1	54.53
12	15 21 10.05	14 24 28.8	117.02	12	17 23 36.70	21 22 43.7	52.99
13	15 23 39.42	14 36 7.9	115.99	13	17 26 12.03	21 27 57.0	51.44
14	15 26 8.98	14 47 40.7	114.94	14	17 28 47.37	21 33 1.0	49.89
15	15 28 38.75	14 59 7.2	113.88	15	17 31 22.71	21 37 55.7	48.33
16	15 31 8.71	15 10 27.3	112.81	16	17 33 58.03	21 42 41.0	46.78
17	15 33 38.86	15 21 40.9	111.72	17	17 36 33.35	21 47 17.0	45.22
18	15 36 9.20	15 32 47.9	110.61	18	17 39 8.65	21 51 43.6	43.65
19	15 38 39.74	15 43 48.2	109.48	19	17 41 43.92	21 56 0.8	42.09
20	15 41 10.46	15 54 41.7	108.34	20	17 44 19.16	22 0 8.7	40.53
21	15 43 41.37	16 5 28.3	107.18	21	17 46 54.37	22 4 7.1	38.96
22	15 46 12.46	16 16 7.9	106.02	22	17 49 29.53	22 7 56.2	37.39
23	15 48 43.73	S. 16 26 40.5	104.83	23	17 52 4.63	S. 22 11 35.8	35.82
<b>WEDNESDAY 26.</b>				<b>FRIDAY 28.</b>			
0	15 51 15.18	S. 16 37 5.9	103.63	0	17 54 39.68	S. 22 15 6.0	34.25
1	15 53 46.81	16 47 24.1	102.42	1	17 57 14.67	22 18 26.8	32.68
2	15 56 18.61	16 57 34.9	101.19	2	17 59 49.58	22 21 38.1	31.14
3	15 58 50.58	17 7 38.4	99.95	3	18 2 24.42	22 24 40.1	29.54
4	16 1 22.72	17 17 34.3	98.69	4	18 4 59.17	22 27 32.6	27.97
5	16 3 55.03	17 27 22.7	97.43	5	18 7 33.84	22 30 15.7	26.40
6	16 6 27.50	17 37 3.5	96.15	6	18 10 8.41	22 32 49.4	24.83
7	16 9 0.13	17 46 36.5	94.86	7	18 12 42.87	22 35 13.7	23.27
8	16 11 32.91	17 56 1.8	93.56	8	18 15 17.23	22 37 28.6	21.71
9	16 14 5.84	18 5 19.2	92.23	9	18 17 51.47	22 39 34.2	20.15
10	16 16 38.92	18 14 28.6	90.90	10	18 20 25.59	22 41 30.4	18.58
11	16 19 12.15	18 23 30.0	89.57	11	18 22 59.58	22 43 17.2	17.02
12	16 21 45.51	18 32 23.4	88.22	12	18 25 33.44	22 44 54.7	15.47
13	16 24 19.01	18 41 8.6	86.84	13	18 28 7.15	22 46 22.9	13.93
14	16 26 52.65	18 49 45.5	85.46	14	18 30 40.72	22 47 41.8	12.38
15	16 29 26.42	18 58 14.1	84.07	15	18 33 14.13	22 48 51.5	10.84
16	16 32 0.31	19 6 34.4	82.68	16	18 35 47.39	22 49 51.9	9.30
17	16 34 34.32	19 14 46.3	81.28	17	18 38 20.48	22 50 43.1	7.77
18	16 37 8.45	19 22 49.7	79.86	18	18 40 53.39	22 51 25.1	6.24
19	16 39 42.69	19 30 44.6	78.43	19	18 43 26.13	22 51 58.0	4.72
20	16 42 17.03	19 38 30.9	76.99	20	18 45 58.69	22 52 21.7	3.19
21	16 44 51.47	19 46 8.5	75.54	21	18 48 31.06	22 52 36.3	1.68
22	16 47 26.02	19 53 37.4	74.09	22	18 51 3.23	22 52 41.9	0.18
23	16 50 0.65	20 0 57.6	72.63	23	18 53 35.20	22 52 38.5	1.32
24	16 52 35.36	S. 20 8 9.0	71.16	24	18 56 6.96	S. 22 52 26.0	2.82



MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
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SATURDAY 29.

0	18 56 6.96	S. 22 52 26.0	2.82
1	18 58 38.51	22 52 4.6	4.31
2	19 1 9.85	22 51 34.3	5.79
3	19 3 40.96	22 50 55.1	7.27
4	19 6 11.84	22 50 7.1	8.73
5	19 8 42.49	22 49 10.3	10.19
6	19 11 12.91	22 48 4.8	11.64
7	19 13 43.08	22 46 50.6	13.09
8	19 16 13.00	22 45 27.7	14.53
9	19 18 42.67	22 43 56.2	15.97
10	19 21 12.08	22 42 16.1	17.39
11	19 23 41.23	22 40 27.5	18.80
12	19 26 10.12	22 38 30.5	20.20
13	19 28 38.73	22 36 25.1	21.60
14	19 31 7.07	22 34 11.3	22.99
15	19 33 35.12	22 31 49.2	24.37
16	19 36 2.89	22 29 18.8	25.74
17	19 38 30.38	22 26 40.3	27.10
18	19 40 57.58	22 23 53.6	28.45
19	19 43 24.48	22 20 58.9	29.79
20	19 45 51.08	22 17 56.1	31.12
21	19 48 17.38	22 14 45.4	32.45
22	19 50 43.38	22 11 26.7	33.77
23	19 53 9.07	S. 22 8 0.2	35.06

SUNDAY 30.

0	19 55 34.45	S. 22 4 26.0	36.35
1	19 57 59.51	22 0 44.0	37.63
2	20 0 24.26	21 56 54.4	38.91
3	20 2 48.69	21 52 57.1	40.17
4	20 5 12.79	21 48 52.3	41.42
5	20 7 36.57	21 44 40.1	42.65
6	20 10 0.02	21 40 20.5	43.88
7	20 12 23.14	21 35 53.5	45.11
8	20 14 45.92	21 31 19.2	46.32
9	20 17 8.38	21 26 37.7	47.52
10	20 19 30.50	21 21 49.0	48.70
11	20 21 52.28	21 16 53.3	49.87
12	20 24 13.71	21 11 50.6	51.03
13	20 26 34.81	21 6 40.9	52.18
14	20 28 55.56	21 1 24.4	53.32
15	20 31 15.97	20 56 1.0	54.46
16	20 33 36.04	20 50 30.9	55.58
17	20 35 55.76	20 44 54.1	56.68
18	20 38 15.13	20 39 10.7	57.78
19	20 40 34.16	20 33 20.8	58.87
20	20 42 52.83	20 27 24.3	59.94
21	20 45 11.16	20 21 21.5	61.00
22	20 47 29.13	20 15 12.3	62.05
23	20 49 46.75	20 8 56.9	63.09
24	20 52 4.02	S. 20 2 35.2	64.12

MONDAY 31.

0	20 52 4.02	S. 20 2 35.2	64.12
1	20 54 20.94	19 56 7.4	65.14
2	20 56 37.51	19 49 33.5	66.15
3	20 58 53.73	19 42 53.6	67.14
4	21 1 9.60	19 36 7.8	68.13
5	21 3 25.11	19 29 16.1	69.10
6	21 5 40.27	19 22 18.6	70.06
7	21 7 55.09	19 15 15.4	71.00
8	21 10 9.55	19 8 6.6	71.94
9	21 12 23.66	19 0 52.1	72.87
10	21 14 37.42	18 53 32.1	73.79
11	21 16 50.84	18 46 6.6	74.70
12	21 19 3.90	18 38 35.7	75.59
13	21 21 16.62	18 30 59.5	76.47
14	21 23 29.00	18 23 18.0	77.34
15	21 25 41.03	18 15 31.4	78.20
16	21 27 52.71	18 7 39.6	79.05
17	21 30 4.06	17 59 42.8	79.88
18	21 32 15.06	17 51 41.0	80.72
19	21 34 25.72	17 43 34.2	81.54
20	21 36 36.05	17 35 22.5	82.34
21	21 38 46.04	17 27 6.1	83.13
22	21 40 55.69	17 18 44.9	83.92
23	21 43 5.01	S. 17 10 19.1	84.69

TUESDAY, NOV. 1.

0	21 45 13.99	S. 17 1 48.6	85.46
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PHASES OF THE MOON.

Oct. 1	) First Quarter -	9 19.1
9	○ Full Moon -	1 42.9
17	( Last Quarter -	6 13.5
24	● New Moon -	3 35.6
30	) First Quarter -	20 1.2

Oct. 11	( Apogee -	- - - - 21
24	( Perigee -	- - - - 16



# MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>b</sup> .	P.L. of diff.	VI <sup>b</sup> .	P.L. of diff.	IX <sup>b</sup> .	P.L. of diff.
1	SUN W.	85 3 46	2743	86 39 29	2758	88 14 52	2772	89 49 57	2786
	Antares W.	25 48 32	2602	27 27 25	2593	29 6 29	2589	30 45 39	2587
	Fomalhaut E.	61 37 10	2675	59 59 57	2698	58 23 15	2722	56 47 5	2747
	α Pegasi E.	78 49 30	2816	77 15 23	2835	75 41 41	2855	74 8 25	2876
2	SUN W.	97 40 38	2859	99 13 50	2872	100 46 45	2887	102 19 21	2900
	Antares W.	39 1 13	2604	40 40 2	2611	42 18 42	2618	43 57 12	2626
	Saturn W.	23 47 30	2531	25 28 0	2545	27 8 11	2557	28 48 5	2569
	Fomalhaut E.	48 55 0	2892	47 22 31	2927	45 50 46	2963	44 19 47	3002
	α Pegasi E.	66 29 0	2993	64 58 38	3019	63 28 48	3046	61 59 33	3074
3	SUN W.	109 58 2	2968	111 28 55	2981	112 59 32	2994	114 29 52	3006
	Antares W.	52 6 54	2669	53 44 15	2679	55 21 23	2688	56 58 19	2698
	Saturn W.	37 3 22	2630	38 41 36	2642	40 19 34	2653	41 57 17	2665
	Fomalhaut E.	36 58 16	3253	35 33 9	3318	34 9 18	3391	32 46 51	3474
	α Pegasi E.	54 42 36	3242	53 17 17	3281	51 52 44	3324	50 29 0	3369
	α Arietis E.	95 56 48	2754	94 21 20	2766	92 46 7	2776	91 11 8	2788
4	SUN W.	121 57 38	3069	123 26 25	3081	124 54 58	3094	126 23 15	3105
	Antares W.	64 59 48	2744	66 35 29	2754	68 10 57	2763	69 46 13	2772
	Saturn W.	50 2 2	2720	51 38 15	2730	53 14 15	2741	54 50 1	2751
	α Pegasi E.	43 44 22	3650	42 26 41	3721	41 10 16	3798	39 55 12	3883
	α Arietis E.	83 19 58	2845	81 46 29	2856	80 13 14	2869	78 40 15	2880
5	Antares W.	77 39 36	2817	79 13 41	2825	80 47 36	2834	82 21 19	2842
	Saturn W.	62 45 33	2799	64 20 2	2808	65 54 19	2818	67 28 24	2826
	α Aquilæ W.	40 56 10	4697	41 57 12	4588	42 59 47	4492	44 3 46	4405
	α Arietis E.	70 59 4	2940	69 27 36	2953	67 56 24	2965	66 25 28	2978
	Aldebaran E.	101 46 13	2782	100 11 21	2790	98 36 40	2800	97 2 12	2808
6	Saturn W.	75 16 2	2868	76 49 2	2876	78 21 51	2884	79 54 30	2892
	α Aquilæ W.	49 41 3	4085	50 51 19	4039	52 2 20	3998	53 14 2	3960
	α Arietis E.	58 54 55	3047	57 25 41	3062	55 56 45	3077	54 28 8	3093
	Aldebaran E.	89 12 36	2849	87 39 12	2858	86 5 59	2866	84 32 57	2873
	Jupiter E.	107 51 42	2856	106 18 27	2865	104 45 23	2872	103 12 28	2879
7	Saturn W.	87 35 19	2929	89 7 1	2936	90 38 34	2943	92 9 59	2950
	α Aquilæ W.	59 20 52	3819	60 35 35	3799	61 50 38	3781	63 6 0	3764
	α Arietis E.	47 76 15	3187	45 43 50	3209	44 17 51	3232	42 52 20	3257
	Aldebaran E.	76 50 7	2910	75 18 1	2916	73 46 3	2924	72 14 15	2931
	Jupiter E.	95 30 15	2915	93 58 15	2922	92 26 24	2928	90 54 41	2935
8	α Aquilæ W.	69 26 34	3706	70 43 15	3698	72 0 4	3692	73 17 0	3686
	Fomalhaut W.	34 11 25	3655	35 29 0	3610	36 47 23	3572	38 6 28	3539
	α Arietis E.	35 52 56	3419	34 31 1	3462	33 9 55	3510	31 49 42	3564
	Aldebaran E.	64 37 17	2963	63 6 18	2969	61 35 26	2975	60 4 42	2981
	Jupiter E.	83 18 10	2966	81 47 14	2972	80 16 26	2977	78 45 45	2984
9	α Aquilæ W.	79 42 47	3672	81 0 4	3672	82 17 21	3672	83 34 38	3673
	Fomalhaut W.	44 49 48	3422	46 11 39	3407	47 33 48	3393	48 56 13	3380
	α Pegasi W.	33 37 35	4621	34 39 42	4504	35 43 30	4402	36 48 49	4312
	Aldebaran E.	52 32 50	3009	51 2 48	3014	49 32 53	3020	48 3 5	3025
	Jupiter E.	71 14 4	3010	69 44 3	3014	68 14 8	3019	66 44 19	3024
	Pollux E.	96 44 39	3027	95 15 0	3031	93 45 26	3037	92 15 59	3041



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	SUN W.	91 24 43	2801	92 59 9	2815	94 33 17	2829	96 7 7	2844
	Antares W.	32 24 52	2588	34 4 4	2590	35 43 12	2593	37 22 16	2599
	Fomalhaut E.	55 11 28	2773	53 36 25	2801	52 1 59	2830	50 28 10	2860
	α Pegasi E.	72 35 35	2898	71 3 13	2920	69 31 19	2943	67 59 54	2967
2	SUN W.	103 51 40	2914	105 23 41	2928	106 55 25	2941	108 26 52	2954
	Antares W.	45 35 31	2634	47 13 40	2643	48 51 37	2652	50 29 21	2660
	Saturn W.	30 27 42	2581	32 7 3	2594	33 46 6	2607	35 24 52	2618
	Fomalhaut E.	42 49 37	3044	41 20 18	3090	39 51 56	3139	38 24 33	3193
	α Pegasi E.	60 30 52	3105	59 2 49	3137	57 35 24	3170	56 8 39	3205
3	SUN W.	115 59 57	3020	117 29 45	3032	118 59 18	3044	120 28 36	3057
	Antares W.	58 35 2	2708	60 11 32	2717	61 47 50	2726	63 23 56	2736
	Saturn W.	43 34 44	2676	45 11 56	2688	46 48 52	2699	48 25 34	2709
	Fomalhaut E.	31 25 58	3567	30 6 47	3672	28 49 30	3793	27 34 21	3933
	α Pegasi E.	49 6 8	3417	47 44 10	3469	46 23 11	3524	45 3 13	3584
	α Arietis E.	89 36 25	2799	88 1 56	2811	86 27 42	2822	84 53 43	2833
4	SUN W.	127 51 18	3117	129 19 7	3129	130 46 42	3141	132 14 2	3153
	Antares W.	71 21 18	2782	72 56 10	2791	74 30 50	2799	76 5 19	2808
	Saturn W.	56 25 33	2761	58 0 52	2770	59 35 59	2781	61 10 52	2790
	α Pegasi E.	38 41 35	3978	37 29 34	4082	36 19 15	4198	35 10 47	4328
	α Arietis E.	77 7 30	2892	75 35 1	2904	74 2 47	2916	72 30 48	2928
5	Antares W.	83 54 52	2851	85 28 13	2859	87 1 24	2868	88 34 24	2876
	Saturn W.	69 2 18	2835	70 36 0	2843	72 9 32	2852	73 42 52	2860
	α Aquilæ W.	45 9 3	4327	46 15 31	4257	47 23 4	4194	48 31 36	4136
	α Arietis E.	64 54 48	2991	63 24 24	3005	61 54 18	3018	60 24 28	3032
	Aldebaran E.	95 27 55	2816	93 53 48	2825	92 19 53	2834	90 46 9	2842
6	Saturn W.	81 26 59	2900	82 59 18	2907	84 31 28	2915	86 3 28	2922
	α Aquilæ W.	54 26 21	3926	55 39 15	3895	56 52 40	3867	58 6 33	3842
	α Arietis E.	52 59 50	3111	51 31 54	3128	50 4 18	3147	48 37 5	3166
	Aldebaran E.	83 0 4	2880	81 27 20	2888	79 54 46	2896	78 22 22	2903
	Jupiter E.	101 39 42	2887	100 7 7	2894	98 34 40	2902	97 2 23	2909
7	Saturn W.	93 41 15	2956	95 12 23	2963	96 43 22	2970	98 14 13	2976
	α Aquilæ W.	64 21 39	3749	65 37 34	3736	66 53 42	3725	68 10 3	3715
	α Arietis E.	41 27 18	3284	40 2 48	3314	38 38 52	3346	37 15 34	3381
	Aldebaran E.	70 42 35	2937	69 11 3	2944	67 39 40	2950	66 8 24	2957
	Jupiter E.	89 23 7	2942	87 51 41	2948	86 20 23	2954	84 49 12	2961
8	α Aquilæ W.	74 34 2	3682	75 51 8	3678	77 8 19	3676	78 25 32	3674
	Fomalhaut W.	39 26 9	3509	40 46 24	3483	42 7 7	3460	43 28 16	3439
	α Arietis E.	30 30 29	3625	29 12 22	3694	27 55 29	3774	26 40 0	3866
	Aldebaran E.	58 34 5	2987	57 3 36	2993	55 33 14	2998	54 2 58	3004
	Jupiter E.	77 15 12	2989	75 44 45	2994	74 14 24	3000	72 44 11	3005
9	α Aquilæ W.	84 51 54	3675	86 9 8	3677	87 26 20	3680	88 43 28	3684
	Fomalhaut W.	50 18 52	3369	51 41 44	3360	53 4 46	3351	54 27 59	3344
	α Pegasi W.	37 55 30	4232	39 3 26	4160	40 12 30	4096	41 22 36	4039
	Aldebaran E.	46 33 23	3030	45 3 47	3035	43 34 17	3039	42 4 53	3044
	Jupiter E.	65 14 36	3028	63 44 58	3033	62 15 2	3037	60 45 59	3041
	Pollux E.	90 46 37	3046	89 17 21	3051	87 48 11	3054	86 19 5	3059



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
10	Fomalhaut W.	55 51 20	3337	57 14 49	3331	58 38 25	3326	60 2 7	3321
	α Pegasi W.	42 33 37	3987	43 45 29	3941	44 58 8	3899	46 11 29	3860
	Aldebaran E.	40 35 35	3049	39 6 23	3053	37 37 16	3058	36 8 15	3063
	Jupiter E.	59 16 37	3045	57 47 20	3049	56 18 8	3052	54 48 59	3056
	Pollux E.	84 50 6	3063	83 21 11	3067	81 52 21	3070	80 23 35	3075
	Mars E.	112 7 27	3260	110 42 29	3264	109 17 35	3268	107 52 46	3272
11	Fomalhaut W.	67 1 49	3304	68 25 56	3301	69 50 7	3299	71 14 20	3297
	α Pegasi W.	52 26 54	3717	53 43 23	3695	55 0 16	3675	56 17 30	3656
	Jupiter E.	47 24 18	3070	45 55 32	3073	44 26 49	3075	42 58 9	3076
	Pollux E.	73 0 55	3091	71 32 35	3094	70 4 18	3096	68 36 4	3100
	Mars E.	100 49 42	3287	99 25 16	3289	98 0 52	3292	96 36 31	3294
12	Fomalhaut W.	78 15 58	3288	79 40 24	3287	81 4 51	3285	82 29 20	3284
	α Pegasi W.	62 48 10	3582	64 7 4	3570	65 26 11	3560	66 45 29	3549
	Jupiter E.	35 35 14	3083	34 6 43	3083	32 18 13	3083	31 9 43	3083
	Pollux E.	61 15 38	3109	59 47 40	3110	58 19 43	3112	56 51 48	3113
	Mars E.	89 35 16	3301	88 11 5	3301	86 46 54	3301	85 22 44	3301
	Regulus E.	97 2 38	3083	95 34 8	3085	94 5 40	3085	92 37 12	3084
13	α Pegasi W.	73 24 45	3504	74 45 5	3496	76 5 34	3488	77 26 11	3481
	α Arietis W.	29 56 35	3686	31 13 37	3635	32 31 34	3588	33 50 22	3547
	Pollux E.	49 32 28	3115	48 4 37	3116	46 36 47	3116	45 8 57	3115
	Mars E.	78 21 44	3296	76 57 28	3294	75 33 9	3292	74 8 48	3288
	Regulus E.	85 14 42	3080	83 46 8	3078	82 17 32	3076	80 48 53	3074
	SUN E.	137 2 6	3491	135 41 32	3487	134 20 53	3483	133 0 10	3479
14	α Pegasi W.	84 11 13	3447	85 32 36	3442	86 54 5	3435	88 15 42	3430
	α Arietis W.	40 34 15	3394	41 56 39	3369	43 19 31	3346	44 42 49	3325
	Pollux E.	37 49 42	3115	36 21 51	3115	34 53 59	3115	33 26 8	3116
	Mars E.	67 6 6	3270	65 41 20	3265	64 16 28	3259	62 51 29	3254
	Regulus E.	73 24 46	3056	71 55 42	3052	70 26 33	3047	68 57 18	3042
	SUN E.	126 15 20	3454	124 54 5	3448	123 32 43	3442	122 11 14	3435
15	α Arietis W.	51 45 3	3233	53 10 33	3216	54 36 23	3199	56 2 33	3183
	Aldebaran W.	18 58 4	3038	20 27 30	3026	21 57 11	3014	23 27 7	3002
	Mars E.	55 44 46	3219	54 19 0	3211	52 53 4	3203	51 26 58	3193
	Regulus E.	61 29 15	3009	59 59 13	3001	58 29 2	2993	56 58 41	2985
	SUN E.	115 21 47	3397	113 59 27	3387	112 36 56	3378	111 14 14	3369
16	α Arietis W.	63 18 9	3105	64 46 13	3089	66 14 36	3074	67 43 18	3058
	Aldebaran W.	31 0 32	2942	32 31 58	2929	34 3 40	2916	35 35 38	2904
	Mars E.	44 13 34	3142	42 46 15	3131	41 18 43	3119	39 50 56	3106
	Regulus E.	49 24 8	2938	47 52 37	2927	46 20 52	2916	44 48 53	2905
	SUN E.	104 17 47	3313	102 53 51	3301	101 29 40	3288	100 5 14	3274
17	α Arietis W.	75 11 41	2977	76 42 22	2961	78 13 23	2945	79 44 45	2929
	Aldebaran W.	43 19 44	2835	44 53 27	2819	46 27 30	2804	48 1 53	2789
	Jupiter W.	24 30 51	2825	26 4 46	2811	27 39 0	2796	29 13 33	2780
	Mars E.	32 28 6	3039	30 58 42	3025	29 29 0	3010	27 59 0	2996
	Regulus E.	37 5 14	2843	35 31 42	2831	33 57 54	2817	32 23 48	2804
	SUN E.	92 59 1	3203	91 32 55	3187	90 6 30	3170	88 39 45	3154
18	α Arietis W.	87 26 52	2844	89 0 23	2827	90 34 15	2809	92 8 31	2793



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Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
10	Fomalhaut W.	61 25 54	3316	62 49 47	3312	64 13 44	3309	65 37 45	3307
	$\alpha$ Pegasi W.	47 25 29	3826	48 40 4	3794	49 55 12	3766	51 10 50	3741
	Aldebaran E.	34 39 20	3066	33 10 29	3071	31 41 44	3076	30 13 5	3080
	Jupiter E.	53 19 56	3059	51 50 56	3062	50 22 0	3065	48 53 7	3068
	Pollux E.	78 54 55	3078	77 26 19	3082	75 57 47	3085	74 29 19	3088
	Mars E.	106 28 2	3275	105 3 21	3279	103 38 45	3282	102 14 12	3284
11	Fomalhaut W.	72 38 35	3294	74 2 53	3293	75 27 13	3292	76 51 34	3289
	$\alpha$ Pegasi W.	57 35 4	3639	58 52 56	3623	60 11 5	3609	61 29 30	3595
	Jupiter E.	41 29 30	3078	40 0 54	3079	38 32 19	3081	37 3 46	3082
	Pollux E.	67 7 54	3102	65 39 46	3104	64 11 41	3106	62 43 39	3107
	Mars E.	95 12 13	3296	93 47 56	3297	92 23 41	3299	90 59 28	3300
12	Fomalhaut W.	83 53 50	3282	85 18 23	3281	86 42 57	3279	88 7 33	3277
	$\alpha$ Pegasi W.	68 4 59	3538	69 24 41	3529	70 44 33	3521	72 4 34	3512
	Jupiter E.	29 41 13	3083	28 12 43	3083	26 44 12	3082	25 15 40	3081
	Pollux E.	55 23 54	3114	53 56 2	3115	52 28 10	3115	51 0 19	3115
	Mars E.	83 58 33	3301	82 34 23	3300	81 10 11	3299	79 45 58	3298
	Regulus E.	91 8 43	3085	89 40 15	3084	88 11 45	3083	86 43 14	3082
13	$\alpha$ Pegasi W.	78 46 56	3474	80 7 49	3467	81 28 50	3461	82 49 58	3454
	$\alpha$ Arietis W.	35 9 54	3511	36 30 6	3477	37 50 56	3446	39 12 20	3419
	Pollux E.	43 41 6	3116	42 13 16	3115	40 45 25	3115	39 17 34	3115
	Mars E.	72 44 23	3286	71 19 55	3283	69 55 24	3278	68 30 47	3275
	Regulus E.	79 20 11	3071	77 51 26	3068	76 22 37	3064	74 53 44	3060
	SUN E.	131 39 22	3475	130 18 30	3470	128 57 32	3465	127 36 29	3460
14	$\alpha$ Pegasi W.	89 37 25	3423	90 59 15	3417	92 21 12	3412	93 43 15	3406
	$\alpha$ Arietis W.	46 6 31	3305	47 30 36	3286	48 55 4	3268	50 19 53	3250
	Pollux E.	31 58 18	3117	30 30 29	3119	29 2 43	3122	27 35 0	3126
	Mars E.	61 26 24	3248	60 1 11	3242	58 35 51	3235	57 10 23	3227
	Regulus E.	67 27 57	3035	65 58 28	3030	64 28 52	3023	62 59 8	3016
	SUN E.	120 49 37	3429	119 27 53	3421	118 6 0	3413	116 43 58	3405
15	$\alpha$ Arietis W.	57 29 2	3167	58 55 50	3151	60 22 58	3136	61 50 24	3120
	Aldebaran W.	24 57 18	2989	26 27 44	2977	27 58 25	2965	29 29 21	2954
	Mars E.	50 0 41	3183	48 34 12	3174	47 7 32	3164	45 40 40	3153
	Regulus E.	55 28 10	2976	53 57 27	2967	52 26 33	2957	50 55 27	2947
	SUN E.	109 51 22	3358	108 28 17	3347	107 5 0	3336	105 41 30	3325
16	$\alpha$ Arietis W.	69 12 19	3042	70 41 40	3026	72 11 21	3010	73 41 21	2994
	Aldebaran W.	37 7 52	2890	38 40 24	2877	40 13 12	2863	41 46 19	2849
	Mars E.	38 22 54	3093	36 54 36	3081	35 26 3	3067	33 57 13	3053
	Regulus E.	43 16 40	2893	41 44 12	2881	40 11 29	2868	38 38 29	2856
	SUN E.	98 40 32	3261	97 15 35	3247	95 50 21	3232	94 24 50	3217
17	$\alpha$ Arietis W.	81 16 27	2912	82 48 31	2895	84 20 56	2878	85 53 43	2861
	Aldebaran W.	49 36 35	2772	51 11 39	2757	52 47 3	2741	54 22 49	2724
	Jupiter W.	30 48 27	2764	32 23 42	2749	33 59 17	2732	35 35 15	2715
	Mars E.	26 28 42	2880	24 58 4	2965	23 27 8	2951	21 55 54	2935
	Regulus E.	30 49 26	2791	29 14 46	2778	27 39 49	2766	26 4 36	2752
	SUN E.	87 12 41	3138	85 45 17	3121	84 17 32	3104	82 49 27	3085
18	$\alpha$ Arietis W.	93 43 8	2775	95 18 9	2759	96 53 31	2741	98 29 17	2723



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VP <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
18	Aldebaran W.	55 58 57	2707	57 35 28	2689	59 12 22	2672	60 49 39	2655
	Jupiter W.	37 11 35	2698	38 48 17	2681	40 25 22	2664	42 2 50	2646
	Pollux W.	13 4 21	3155	14 31 24	3052	16 0 38	2969	17 31 25	2901
	SUN E.	81 20 59	3068	79 52 10	3049	78 22 58	3031	76 53 23	3012
19	Aldebaran W.	69 2 10	2563	70 41 56	2545	72 22 7	2525	74 2 45	2507
	Jupiter W.	50 16 21	2554	51 56 19	2535	53 36 43	2517	55 17 33	2497
	Pollux W.	25 23 31	2682	27 0 36	2650	28 38 23	2620	30 16 51	2591
	SUN E.	69 19 33	2915	67 47 33	2895	66 15 8	2875	64 42 17	2855
20	Aldebaran W.	82 32 35	2411	84 15 54	2391	85 59 41	2373	87 43 54	2354
	Jupiter W.	63 48 29	2401	65 32 2	2382	67 16 2	2364	69 0 29	2344
	Pollux W.	38 38 27	2465	40 20 29	2442	42 3 4	2419	43 46 11	2398
	SUN E.	56 51 38	2756	55 16 12	2737	53 40 21	2717	52 4 3	2698
21	Jupiter W.	77 49 35	2252	79 36 45	2235	81 24 21	2217	83 12 24	2200
	Pollux W.	52 29 24	2295	54 15 31	2275	56 2 7	2257	57 49 10	2239
	Mars W.	18 38 1	2457	20 20 14	2436	22 2 57	2415	23 46 10	2395
	Regulus W.	16 34 5	2329	18 19 22	2300	20 5 22	2273	21 52 1	2249
	SUN E.	43 56 18	2607	42 17 32	2590	40 38 24	2574	38 58 53	2558
26	SUN W.	26 34 5	2388	28 17 58	2389	30 1 49	2392	31 45 35	2398
	$\alpha$ Aquilæ E.	62 54 5	2900	61 21 46	2940	59 50 18	2985	58 19 46	3034
	Fomalhaut E.	93 51 2	2217	92 3 0	2225	90 15 10	2234	88 27 33	2245
27	SUN W.	40 21 48	2444	42 4 20	2456	43 46 35	2470	45 28 31	2483
	$\alpha$ Aquilæ E.	51 4 18	3362	49 41 18	3448	48 19 55	3542	47 0 17	3644
	Fomalhaut E.	79 33 55	2312	77 48 13	2328	76 2 55	2346	74 18 2	2364
	$\alpha$ Pegasi E.	96 15 27	2505	94 34 21	2517	92 53 31	2530	91 12 59	2543
28	SUN W.	53 53 13	2559	55 33 5	2575	57 12 34	2593	58 51 39	2610
	Antares W.	21 34 42	2487	23 16 14	2467	24 58 14	2455	26 40 31	2448
	Fomalhaut E.	65 40 36	2469	63 58 39	2493	62 17 15	2517	60 36 26	2543
	$\alpha$ Pegasi E.	82 55 32	2629	81 17 16	2649	79 39 27	2670	78 2 7	2692
29	SUN W.	67 1 9	2699	68 37 51	2717	70 14 8	2736	71 50 0	2753
	Antares W.	35 12 31	2465	36 54 34	2474	38 36 24	2484	40 18 0	2495
	Saturn W.	17 55 21	2387	19 39 14	2405	21 22 41	2422	23 5 44	2440
	Fomalhaut E.	52 21 52	2693	50 45 2	2727	49 8 58	2763	47 33 41	2801
	$\alpha$ Pegasi E.	70 3 17	2819	68 29 13	2848	66 55 47	2877	65 22 59	2908
30	SUN W.	79 43 21	2845	81 16 50	2864	82 49 55	2881	84 22 38	2900
	Antares W.	48 41 50	2559	50 21 41	2573	52 1 13	2587	53 40 26	2601
	Saturn W.	31 34 51	2526	33 15 28	2543	34 55 41	2560	36 35 31	2576
	Fomalhaut E.	39 50 52	3036	38 21 24	3095	36 53 8	3159	35 26 10	3230
	$\alpha$ Pegasi E.	57 49 20	3085	56 20 52	3125	54 53 13	3168	53 26 25	3213
	$\alpha$ Arietis E.	99 19 33	2642	97 41 35	2657	96 3 58	2673	94 26 42	2689
31	SUN W.	92 0 32	2986	93 31 2	3003	95 1 11	3019	96 31 0	3036
	Antares W.	61 51 37	2673	63 28 53	2687	65 5 51	2701	66 42 30	2715
	Saturn W.	44 49 3	2657	46 26 40	2673	48 3 56	2689	49 40 51	2703
	$\alpha$ Pegasi E.	46 26 47	3483	45 6 4	3550	43 46 35	3621	42 28 23	3697
	$\alpha$ Arietis E.	86 25 48	2770	84 50 41	2786	83 15 55	2802	81 41 30	2819



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18	Aldebaran W.	62° 27' 20"	2637	64° 5' 25"	2618	65° 43' 55"	2600	67° 22' 50"	2582	
	Jupiter W.	43° 40' 43"	2628	45° 19' 0"	2610	46° 57' 42"	2591	48° 36' 49"	2573	
	Pollux W.	19° 3' 43"	2845	20° 37' 13"	2797	22° 11' 45"	2754	23° 47' 13"	2716	
	Sun E.	75° 23' 25"	2993	73° 53' 3"	2974	72° 22' 18"	2954	70° 51' 7"	2935	
19	Aldebaran W.	75° 43' 49"	2487	77° 25' 21"	2469	79° 7' 18"	2449	80° 49' 43"	2430	
	Jupiter W.	56° 58' 50"	2478	58° 40' 34"	2459	60° 22' 45"	2439	62° 5' 24"	2421	
	Pollux W.	31° 55' 58"	2564	33° 35' 42"	2538	35° 16' 3"	2513	36° 56' 58"	2489	
	Sun E.	63° 9' 1"	2835	61° 35' 19"	2815	60° 1' 11"	2796	58° 26' 38"	2776	
20	Aldebaran W.	89° 28' 35"	2335	91° 13' 43"	2317	92° 59' 17"	2298	94° 45' 19"	2281	
	Jupiter W.	70° 45' 24"	2326	72° 30' 46"	2307	74° 16' 36"	2289	76° 2' 52"	2270	
	Pollux W.	45° 29' 49"	2376	47° 13' 58"	2355	48° 58' 37"	2335	50° 43' 46"	2315	
	Sun E.	50° 27' 20"	2679	48° 50' 12"	2660	47° 12' 38"	2643	45° 34' 41"	2624	
21	Jupiter W.	85° 0' 51"	2183	86° 49' 44"	2167	88° 39' 1"	2151	90° 28' 42"	2136	
	Pollux W.	59° 36' 40"	2221	61° 24' 37"	2204	63° 12' 59"	2187	65° 1' 46"	2170	
	Mars W.	25° 29' 51"	2376	27° 14' 0"	2359	28° 58' 34"	2341	30° 43' 34"	2324	
	Regulus W.	23° 39' 16"	2227	25° 27' 4"	2206	27° 15' 23"	2186	29° 4' 11"	2168	
	Sun E.	37° 19' 1"	2543	35° 38' 48"	2530	33° 58' 17"	2518	32° 17' 28"	2507	
26	Sun W.	33° 29' 13"	2405	35° 12' 41"	2413	36° 55' 57"	2422	38° 39' 0"	2433	
	α Aquilæ E.	56° 50' 16"	3088	55° 21' 52"	3148	53° 54' 41"	3213	52° 28' 48"	3284	
	Fomalhaut E.	86° 40' 13"	2256	84° 53' 9"	2269	83° 6' 24"	2283	81° 19' 59"	2297	
27	Sun W.	47° 10' 9"	2497	48° 51' 27"	2512	50° 32' 24"	2527	52° 12' 59"	2543	
	α Aquilæ E.	45° 42' 30"	3757	44° 26' 43"	3881	43° 13' 4"	4020	42° 1' 44"	4173	
	Fomalhaut E.	72° 33' 36"	2383	70° 49' 37"	2403	69° 6' 6"	2424	67° 23' 6"	2446	
	α Pegasi E.	89° 32' 45"	2558	87° 52' 53"	2574	86° 13' 22"	2591	84° 34' 15"	2609	
28	Sun W.	60° 30' 21"	2627	62° 8' 39"	2645	63° 46' 33"	2663	65° 24' 3"	2681	
	Antares W.	28° 22' 57"	2446	30° 5' 27"	2447	31° 47' 54"	2451	33° 30' 17"	2457	
	Fomalhaut E.	58° 56' 13"	2571	57° 16' 38"	2599	55° 37' 42"	2629	53° 59' 26"	2660	
	α Pegasi E.	76° 25' 17"	2715	74° 48' 57"	2740	73° 13' 10"	2765	71° 37' 56"	2791	
29	Sun W.	73° 25' 29"	2772	75° 0' 33"	2791	76° 35' 13"	2809	78° 9' 29"	2828	
	Antares W.	41° 59' 21"	2507	43° 40' 25"	2520	45° 21' 11"	2532	47° 1' 40"	2545	
	Saturn W.	24° 48' 22"	2457	26° 30' 35"	2474	28° 12' 25"	2492	29° 53' 50"	2509	
	Fomalhaut E.	45° 59' 15"	2842	44° 25' 42"	2886	42° 53' 5"	2932	41° 21' 27"	2982	
	α Pegasi E.	63° 50' 50"	2940	62° 19' 22"	2974	60° 48' 37"	3009	59° 18' 36"	3046	
30	Sun W.	85° 54' 57"	2917	87° 26' 54"	2935	88° 58' 28"	2952	90° 29' 41"	2969	
	Antares W.	55° 19' 19"	2615	56° 57' 53"	2630	58° 36' 7"	2644	60° 14' 2"	2659	
	Saturn W.	38° 14' 59"	2593	39° 54' 3"	2610	41° 32' 45"	2626	43° 11' 5"	2642	
	Fomalhaut E.	34° 0' 36"	3308	32° 36' 34"	3395	31° 14' 12"	3494	29° 53' 41"	3606	
	α Pegasi E.	52° 0' 31"	3261	50° 35' 34"	3311	49° 11' 35"	3365	47° 48' 38"	3422	
	α Arietis E.	92° 49' 48"	2706	91° 13' 16"	2722	89° 37' 5"	2738	88° 1' 16"	2754	
31	Sun W.	98° 0' 28"	3052	99° 29' 37"	3068	100° 58' 26"	3083	102° 26' 57"	3098	
	Antares W.	68° 18' 50"	2729	69° 54' 52"	2742	71° 30' 36"	2755	73° 6' 3"	2769	
	Saturn W.	51° 17' 27"	2719	52° 53' 42"	2733	54° 29' 39"	2747	56° 5' 16"	2761	
	α Pegasi E.	41° 11' 33"	3781	39° 56' 11"	3873	38° 42' 24"	3973	37° 30' 18"	4083	
	α Arietis E.	80° 7' 27"	2835	78° 33' 44"	2851	77° 0' 22"	2867	75° 27' 21"	2883	



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1.63894	1.44803	0.20709	1.42752	51.690	h m s 11 18 4.69
2	1.63843	1.45337	0.20758	1.42748	51.292	11 14 8.79
3	1.63786	1.45864	0.20808	1.42745	50.900	11 10 12.88
4	1.63724	1.46382	0.20858	1.42743	50.515	11 6 16.98
5	1.63657	1.46893	0.20908	1.42742	50.136	11 2 21.07
6	1.63584	1.47395	0.20959	1.42742	49.765	10 58 25.16
7	1.63505	1.47891	0.21010	1.42743	49.401	10 54 29.26
8	1.63421	1.48380	0.21061	1.42745	49.043	10 50 33.35
9	1.63331	1.48861	0.21112	1.42748	48.692	10 46 37.44
10	1.63235	1.49334	0.21164	1.42752	48.349	10 42 41.54
11	1.63133	1.49800	0.21216	1.42757	48.015	10 38 45.63
12	1.63026	1.50259	0.21269	1.42762	47.687	10 34 49.72
13	1.62914	1.50711	0.21322	1.42768	47.365	10 30 53.81
14	1.62795	1.51155	0.21376	1.42775	47.052	10 26 57.90
15	1.62671	1.51591	0.21430	1.42783	46.748	10 23 1.99
16	1.62541	1.52021	0.21485	1.42792	46.450	10 19 6.09
17	1.62405	1.52444	0.21540	1.42801	46.160	10 15 10.18
18	1.62263	1.52860	0.21596	1.42811	45.879	10 11 14.27
19	1.62115	1.53269	0.21652	1.42822	45.605	10 7 18.37
20	1.61962	1.53670	0.21708	1.42833	45.340	10 3 22.46
21	1.61803	1.54065	0.21765	1.42845	45.082	9 59 26.55
22	1.61637	1.54452	0.21823	1.42858	44.834	9 55 30.65
23	1.61466	1.54833	0.21882	1.42871	44.593	9 51 34.74
24	1.61289	1.55207	0.21941	1.42885	44.361	9 47 38.83
25	1.61105	1.55574	0.22001	1.42899	44.138	9 43 42.93
26	1.60916	1.55934	0.22062	1.42914	43.923	9 39 47.02
27	1.60721	1.56287	0.22123	1.42929	43.717	9 35 51.11
28	1.60520	1.56634	0.22185	1.42945	43.519	9 31 55.20
29	1.60312	1.56973	0.22248	1.42961	43.331	9 27 59.29
30	1.60098	1.57306	0.22311	1.42977	43.151	9 24 3.38
31	1.59879	1.57632	0.22374	1.42994	42.980	9 20 7.48
32	1.59653	1.57951	0.22439	1.43011	42.819	9 16 11.57



Day of the Month.	BESSEL'S Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>s</sup> .785249.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	+1.2682	+0.4852	+9.6138	+0.2460	2404337	192	273	.7474
2	1.2670	0.5319	9.6158	0.2454	2404338	193	274	.7502
3	1.2657	0.5740	9.6177	0.2450	2404339	194	275	.7529
4	+1.2642	+0.6123	+9.6196	+0.2447	2404340	195	276	.7557
5	1.2626	0.6473	9.6216	0.2445	2404341	196	277	.7584
6	1.2609	0.6796	9.6235	0.2445	2404342	197	278	.7611
7	+1.2590	+0.7096	+9.6255	+0.2447	2404343	198	279	.7639
8	1.2570	0.7376	9.6275	0.2450	2404344	199	280	.7667
9	1.2549	0.7637	9.6294	0.2454	2404345	200	281	.7694
10	+1.2526	+0.7883	+9.6314	+0.2460	2404346	201	282	.7721
11	1.2502	0.8114	9.6334	0.2466	2404347	202	283	.7748
12	1.2476	0.8333	9.6354	0.2475	2404348	203	284	.7776
13	+1.2449	+0.8540	+9.6374	+0.2484	2404349	204	285	.7803
14	1.2420	0.8736	9.6394	0.2495	2404350	205	286	.7830
15	1.2389	0.8923	9.6414	0.2507	2404351	206	287	.7858
16	+1.2358	+0.9101	+9.6435	+0.2520	2404352	207	288	.7885
17	1.2324	0.9270	9.6455	0.2534	2404353	208	289	.7913
18	1.2289	0.9433	9.6476	0.2549	2404354	209	290	.7940
19	+1.2253	+0.9588	+9.6497	+0.2565	2404355	210	291	.7967
20	1.2214	0.9737	9.6518	0.2582	2404356	211	292	.7995
21	1.2174	0.9879	9.6539	0.2600	2404357	212	293	.8022
22	+1.2133	+1.0016	+9.6560	+0.2619	2404358	213	294	.8049
23	1.2089	1.0147	9.6581	0.2638	2404359	214	295	.8077
24	1.2044	1.0274	9.6602	0.2659	2404360	215	296	.8104
25	+1.1997	+1.0395	+9.6624	+0.2679	2404361	216	297	.8132
26	1.1948	1.0513	9.6646	0.2701	2404362	217	298	.8159
27	1.1897	1.0625	9.6668	0.2723	2404363	218	299	.8186
28	+1.1844	+1.0734	+9.6690	+0.2745	2404364	219	300	.8214
29	1.1789	1.0839	9.6712	0.2768	2404365	220	301	.8241
30	1.1732	1.0940	9.6735	0.2791	2404366	221	302	.8268
31	1.1673	1.1037	9.6757	0.2814	2404367	222	303	.8296
32	+1.1612	+1.1131	+9.6780	+0.2838	2404368	223	304	.8323

\* Add .0026 if Fraction be required for the time t, see page 329.

\* Add .0026 if Fraction be required for the time t, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	14 25 57.22	9.800	S. 14 28 4.2	48.08	I 6.95	16 17.17	0.056
Wed.	2	14 29 52.81	9.833	14 47 11.1	47.48	I 7.07	16 18.13	0.024
Thur.	3	14 33 49.19	9.866	15 6 3.4	46.87	I 7.18	16 18.31	0.009
Frid.	4	14 37 46.37	9.900	15 24 40.8	46.24	I 7.30	16 17.68	0.043
Sat.	5	14 41 44.37	9.934	15 43 3.0	45.60	I 7.41	16 16.24	0.077
Sun.	6	14 45 43.19	9.968	16 1 9.4	44.94	I 7.53	16 13.98	0.111
Mon.	7	14 49 42.85	10.003	16 18 59.8	44.26	I 7.65	16 10.89	0.146
Tues.	8	14 53 43.35	10.039	16 36 33.7	43.56	I 7.77	16 6.96	0.181
Wed.	9	14 57 44.70	10.074	16 53 50.7	42.85	I 7.89	16 2.18	0.217
Thur.	10	15 1 46.90	10.110	17 10 50.6	42.12	I 8.01	15 56.54	0.253
Frid.	11	15 5 49.96	10.146	17 27 32.8	41.38	I 8.13	15 50.05	0.288
Sat.	12	15 9 53.89	10.182	17 43 57.0	40.62	I 8.25	15 42.70	0.324
Sun.	13	15 13 58.68	10.217	18 0 2.9	39.85	I 8.37	15 34.49	0.360
Mon.	14	15 18 4.33	10.254	18 15 49.9	39.06	I 8.49	15 25.42	0.396
Tues.	15	15 22 10.85	10.290	18 31 17.7	38.26	I 8.60	15 15.49	0.432
Wed.	16	15 26 18.22	10.325	18 46 26.2	37.44	I 8.72	15 4.70	0.468
Thur.	17	15 30 26.46	10.361	19 1 14.7	36.59	I 8.83	14 53.05	0.503
Frid.	18	15 34 35.56	10.396	19 15 42.7	35.74	I 8.95	14 40.55	0.538
Sat.	19	15 38 45.49	10.431	19 29 50.0	34.87	I 9.06	14 27.21	0.573
Sun.	20	15 42 56.27	10.467	19 43 36.3	33.98	I 9.17	14 13.03	0.608
Mon.	21	15 47 7.88	10.501	19 57 1.1	33.08	I 9.29	13 58.01	0.643
Tues.	22	15 51 20.31	10.535	20 10 4.0	32.16	I 9.40	13 42.18	0.676
Wed.	23	15 55 33.54	10.567	20 22 44.8	31.23	I 9.51	13 25.55	0.709
Thur.	24	15 59 47.55	10.600	20 35 3.0	30.28	I 9.62	13 8.14	0.741
Frid.	25	16 4 2.33	10.631	20 46 58.3	29.32	I 9.72	12 49.97	0.773
Sat.	26	16 8 17.85	10.661	20 58 30.2	28.34	I 9.82	12 31.06	0.803
Sun.	27	16 12 34.08	10.691	21 9 38.4	27.34	I 9.92	12 11.44	0.832
Mon.	28	16 16 51.01	10.720	21 20 22.6	26.33	I 10.02	11 51.12	0.861
Tues.	29	16 21 8.62	10.748	21 30 42.5	25.31	I 10.11	11 30.12	0.889
Wed.	30	16 25 26.89	10.775	21 40 37.8	24.28	I 10.21	11 8.47	0.915
Thur.	31	16 29 45.80	10.801	S. 21 50 8.1	23.24	I 10.30	10 46.18	0.942

\* Mean Time of the Semidiameter passing may be found by subtracting 0<sup>m</sup>.19 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Tues.	1	14 25 59.88	S. 14 28 17.3	16 9.7	16 17.19	14 42 17.07
Wed.	2	14 29 55.48	14 47 24.0	16 9.9	16 18.14	14 46 13.62
Thur.	3	14 33 51.87	15 6 16.1	16 10.2	16 18.31	14 50 10.18
Frid.	4	14 37 49.06	15 24 53.4	16 10.4	16 17.67	14 54 6.73
Sat.	5	14 41 47.06	15 43 15.3	16 10.7	16 16.22	14 58 3.28
Sun.	6	14 45 45.89	16 1 21.5	16 10.9	16 13.95	15 1 59.84
Mon.	7	14 49 45.55	16 19 11.7	16 11.2	16 10.85	15 5 56.40
Tues.	8	14 53 46.05	16 36 45.4	16 11.4	16 6.91	15 9 52.96
Wed.	9	14 57 47.39	16 54 2.2	16 11.6	16 2.12	15 13 49.51
Thur.	10	15 1 49.59	17 11 1.7	16 11.9	15 56.47	15 17 46.06
Frid.	11	15 5 52.64	17 27 43.7	16 12.1	15 49.97	15 21 42.61
Sat.	12	15 9 56.56	17 44 7.7	16 12.3	15 42.61	15 25 39.17
Sun.	13	15 14 1.33	18 0 13.2	16 12.5	15 34.40	15 29 35.73
Mon.	14	15 18 6.97	18 15 59.9	16 12.7	15 25.32	15 33 32.29
Tues.	15	15 22 13.47	18 31 27.4	16 12.9	15 15.38	15 37 28.85
Wed.	16	15 26 20.82	18 46 35.5	16 13.1	15 4.58	15 41 25.40
Thur.	17	15 30 29.03	19 1 23.7	16 13.3	14 52.93	15 45 21.96
Frid.	18	15 34 38.10	19 15 51.4	16 13.5	14 40.42	15 49 18.52
Sat.	19	15 38 48.00	19 29 58.4	16 13.7	14 27.07	15 53 15.07
Sun.	20	15 42 58.74	19 43 44.3	16 13.9	14 12.88	15 57 11.62
Mon.	21	15 47 10.32	19 57 8.8	16 14.1	13 57.86	16 1 8.18
Tues.	22	15 51 22.71	20 10 11.4	16 14.3	13 42.02	16 5 4.73
Wed.	23	15 55 35.90	20 22 51.8	16 14.5	13 25.39	16 9 1.29
Thur.	24	15 59 49.87	20 35 9.6	16 14.6	13 7.97	16 12 57.84
Frid.	25	16 4 4.60	20 47 4.5	16 14.8	12 49.80	16 16 54.40
Sat.	26	16 8 20.07	20 58 36.1	16 15.0	12 30.89	16 20 50.96
Sun.	27	16 12 36.25	21 9 44.0	16 15.2	12 11.27	16 24 47.52
Mon.	28	16 16 53.12	21 20 27.9	16 15.3	11 50.95	16 28 44.07
Tues.	29	16 21 10.68	21 30 47.4	16 15.5	11 29.95	16 32 40.63
Wed.	30	16 25 28.89	21 40 42.3	16 15.7	11 8.30	16 36 37.19
Thur.	31	16 29 47.74	S. 21 50 12.3	16 15.8	10 46.01	16 40 33.75

\* The Semidiameter for *Apparent Noon* may be assumed the same as that for *Mean Noon*.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	218° 53' 22.4"	S. 0° 28'	9.9964594	15° 22.8'	15° 17.0'	56° 20.8'	55° 59.7'
2	219 53 29.0	0.36	9.9963460	15 11.7	15 6.9	55 40.4	55 22.8
3	220 53 37.1	0.42	9.9962338	15 2.6	14 58.8	55 7.1	54 53.1
4	221 53 46.8	0.45	9.9961231	14 55.5	14 52.6	54 40.8	54 30.1
5	222 53 58.1	0.46	9.9960139	14 50.1	14 48.1	54 21.1	54 13.6
6	223 54 11.1	0.44	9.9959064	14 46.4	14 45.1	54 7.5	54 2.8
7	224 54 25.8	0.41	9.9958006	14 44.2	14 43.6	53 59.4	53 57.3
8	225 54 42.2	0.35	9.9956964	14 43.4	14 43.5	53 56.5	53 57.0
9	226 55 0.3	0.28	9.9955940	14 44.0	14 44.9	53 58.8	54 1.9
10	227 55 20.3	0.18	9.9954935	14 46.1	14 47.7	54 6.4	54 12.3
11	228 55 42.1	S. 0° 07'	9.9953949	14 49.7	14 52.2	54 19.8	54 28.9
12	229 56 5.7	N. 0° 04'	9.9952980	14 55.2	14 58.6	54 39.7	54 52.3
13	230 56 31.1	0.16	9.9952029	15 2.5	15 7.0	55 6.7	55 22.9
14	231 56 58.4	0.27	9.9951095	15 11.9	15 17.4	55 41.0	56 1.1
15	232 57 27.4	0.39	9.9950178	15 23.4	15 29.8	56 22.9	56 46.4
16	233 57 58.3	0.49	9.9949277	15 36.6	15 43.8	57 11.4	57 37.7
17	234 58 31.0	0.57	9.9948391	15 51.2	15 58.7	58 4.9	58 32.6
18	235 59 5.5	0.63	9.9947519	16 6.3	16 13.7	59 0.3	59 27.5
19	236 59 41.6	0.66	9.9946660	16 20.8	16 27.3	59 53.4	60 17.3
20	238 0 19.5	0.66	9.9945812	16 33.1	16 38.0	60 38.6	60 56.6
21	239 0 59.1	0.61	9.9944974	16 41.8	16 44.4	61 10.5	61 19.9
22	240 1 40.4	0.54	9.9944146	16 45.7	16 45.5	61 24.5	61 23.9
23	241 2 23.2	0.43	9.9943329	16 43.9	16 41.0	61 18.1	61 7.4
24	242 3 7.3	0.30	9.9942522	16 36.8	16 31.5	60 52.1	60 32.7
25	243 3 52.7	0.16	9.9941725	16 25.3	16 18.3	60 9.9	59 44.3
26	244 4 39.2	N. 0° 02'	9.9940940	16 10.8	16 2.9	59 16.8	58 48.0
27	245 5 26.6	S. 0° 11'	9.9940168	15 54.9	15 47.0	58 18.6	57 49.4
28	246 6 15.0	0.22	9.9939411	15 39.2	15 31.6	57 20.8	56 53.3
29	247 7 4.2	0.31	9.9938671	15 24.5	15 17.9	56 27.3	56 3.1
30	248 7 54.3	0.37	9.9937950	15 11.9	15 6.4	55 40.9	55 20.8
31	249 8 45.3	S. 0° 41'	9.9937248	15 1.5	14 57.3	55 3.0	54 47.5



## MEAN TIME.

Day of the Week.	Day of the Month.	THE MOON'S							
		Longitude.		Latitude.		Age.	Meridian Passage.		
		Noon.	Midnight.	Noon.	Midnight.				
		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	
Tues.	1	322 49 56.5	329 11 2.4	S. 3 17 58.4	S. 3 42 23.0	7.9	7	17.3	
Wed.	2	335 28 9.2	341 41 44.0	4 3 49.1	4 22 8.0	8.9	8	3.9	
Thur.	3	347 52 12.5	353 59 58.0	4 37 12.5	4 48 57.8	9.9	8	47.9	
Frid.	4	0 5 22.1	6 8 44.2	4 57 20.4	5 2 18.7	10.9	9	30.2	
Sat.	5	12 10 21.5	18 10 29.3	5 3 52.7	5 2 4.0	11.9	10	11.7	
Sun.	6	24 9 20.6	30 7 8.0	4 56 55.8	4 48 33.0	12.9	10	53.0	
Mon.	7	36 4 2.6	42 0 15.0	4 37 2.0	4 22 30.8	13.9	11	35.1	
Tues.	8	47 55 55.9	53 51 16.4	4 5 8.9	3 45 7.0	14.9	12	18.4	
Wed.	9	59 46 28.5	65 41 45.4	3 22 37.6	2 57 54.0	15.9	13	3.5	
Thur.	10	71 37 21.8	77 33 34.9	2 31 10.8	2 2 43.5	16.9	13	50.6	
Frid.	11	83 30 43.3	89 29 8.9	1 32 48.6	S. 1 1 43.5	17.9	14	39.4	
Sat.	12	95 29 14.9	101 31 28.1	S. 0 29 45.9	N. 0 2 45.3	18.9	15	29.6	
Sun.	13	107 36 17.0	113 44 12.2	N. 0 35 30.6	1 8 9.6	19.9	16	20.7	
Mon.	14	119 55 46.0	126 11 31.4	1 40 21.3	2 11 43.4	20.9	17	11.8	
Tues.	15	132 32 2.2	138 57 51.5	2 41 52.8	3 10 25.3	21.9	18	2.6	
Wed.	16	145 29 30.3	152 7 26.7	3 36 55.6	4 0 57.4	22.9	18	52.9	
Thur.	17	158 52 4.1	165 43 40.0	4 22 4.0	4 39 48.1	23.9	19	43.0	
Frid.	18	172 42 23.4	179 48 14.0	4 53 43.3	5 3 24.3	24.9	20	33.6	
Sat.	19	187 0 59.8	194 20 16.4	5 8 28.6	5 8 37.4	25.9	21	25.3	
Sun.	20	201 45 26.1	209 15 39.0	5 3 37.9	4 53 23.7	26.9	22	19.3	
Mon.	21	216 49 52.5	224 26 54.4	4 37 57.1	4 17 29.2	27.9	23	16.0	
Tues.	22	232 5 25.6	239 44 3.3	3 52 20.1	3 22 59.3	28.9	6		
Wed.	23	247 21 24.8	254 56 11.3	2 50 3.5	2 14 15.5	0.4	0	15.8	
Thur.	24	262 27 10.9	269 53 21.5	1 36 21.8	N. 0 57 10.6	1.4	1	17.8	
Frid.	25	277 13 52.6	284 28 5.4	N. 0 17 29.4	S. 0 21 57.4	2.4	2	20.3	
Sat.	26	291 35 34.4	298 36 5.6	S. 1 0 28.7	1 37 28.8	3.4	3	21.2	
Sun.	27	305 29 35.9	312 16 11.8	2 12 27.1	2 44 58.3	4.4	4	18.6	
Mon.	28	318 56 7.1	325 29 42.7	3 14 42.5	3 41 23.8	5.4	5	11.7	
Tues.	29	331 57 23.7	338 19 38.6	4 4 50.6	4 24 54.7	6.4	6	0.7	
Wed.	30	344 36 58.2	350 49 54.3	4 41 30.7	4 54 35.4	7.4	6	46.2	
Thur.	31	356 58 59.2	3 4 44.5	S. 5 4 7.6	S. 5 10 7.5	8.4	7	29.3	



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 1.</b>				<b>THURSDAY 3.</b>			
0	h m s 21 45 13.99	S. 17 1 48.6	85.46	0	h m s 23 22 41.17	S. 9 2 52.6	110.51
1	21 47 22.65	16 53 13.6	86.21	1	23 24 36.98	8 51 48.6	110.82
2	21 49 30.97	16 44 34.1	86.95	2	23 26 32.59	8 40 42.8	111.11
3	21 51 38.97	16 35 50.2	87.68	3	23 28 28.01	8 29 35.3	111.39
4	21 53 46.65	16 27 2.0	88.40	4	23 30 23.25	8 18 26.1	111.67
5	21 55 54.01	16 18 9.4	89.12	5	23 32 18.30	8 7 15.2	111.95
6	21 58 1.04	16 9 12.6	89.81	6	23 34 13.17	7 56 2.7	112.22
7	22 0 7.76	16 0 11.7	90.49	7	23 36 7.87	7 44 48.6	112.48
8	22 2 14.16	15 51 6.7	91.17	8	23 38 2.40	7 33 33.0	112.72
9	22 4 20.24	15 41 57.6	91.84	9	23 39 56.75	7 22 16.0	112.96
10	22 6 26.01	15 32 44.6	92.50	10	23 41 50.94	7 10 57.5	113.20
11	22 8 31.48	15 23 27.6	93.15	11	23 43 44.97	6 59 37.6	113.43
12	22 10 36.63	15 14 6.8	93.78	12	23 45 38.84	6 48 16.4	113.64
13	22 12 41.48	15 4 42.2	94.41	13	23 47 32.55	6 36 53.9	113.85
14	22 14 46.03	14 55 13.9	95.03	14	23 49 26.12	6 25 30.2	114.05
15	22 16 50.28	14 45 41.9	95.63	15	23 51 19.53	6 14 5.3	114.24
16	22 18 54.24	14 36 6.3	96.23	16	23 53 12.79	6 2 39.3	114.43
17	22 20 57.89	14 26 27.1	96.82	17	23 55 5.92	5 51 12.1	114.62
18	22 23 1.26	14 16 44.4	97.41	18	23 56 58.90	5 39 43.9	114.79
19	22 25 4.34	14 6 58.2	97.98	19	23 58 51.75	5 28 14.6	114.96
20	22 27 7.13	13 57 8.7	98.53	20	0 0 44.47	5 16 44.4	115.11
21	22 29 9.64	13 47 15.9	99.08	21	0 2 37.06	5 5 13.3	115.26
22	22 31 11.87	13 37 19.8	99.62	22	0 4 29.52	4 53 41.3	115.40
23	22 33 13.83	S. 13 27 20.4	100.16	23	0 6 21.86	S. 4 42 8.5	115.53
<b>WEDNESDAY 2.</b>				<b>FRIDAY 4.</b>			
0	22 35 15.50	S. 13 17 17.9	100.68	0	0 8 14.08	S. 4 30 34.9	115.67
1	22 37 16.90	13 7 12.3	101.19	1	0 10 6.19	4 19 0.5	115.79
2	22 39 18.04	12 57 3.7	101.68	2	0 11 58.18	4 7 25.4	115.90
3	22 41 18.91	12 46 52.1	102.18	3	0 13 50.07	3 55 49.7	116.01
4	22 43 19.52	12 36 37.5	102.67	4	0 15 41.85	3 44 13.3	116.12
5	22 45 19.86	12 26 20.1	103.13	5	0 17 33.53	3 32 36.3	116.21
6	22 47 19.95	12 15 59.9	103.61	6	0 19 25.11	3 20 58.8	116.29
7	22 49 19.79	12 5 36.8	104.07	7	0 21 16.59	3 9 20.8	116.37
8	22 51 19.37	11 55 11.1	104.51	8	0 23 7.99	2 57 42.4	116.43
9	22 53 18.71	11 44 42.7	104.95	9	0 24 59.29	2 46 3.6	116.51
10	22 55 17.80	11 34 11.7	105.38	10	0 26 50.51	2 34 24.3	116.57
11	22 57 16.65	11 23 38.1	105.80	11	0 28 41.65	2 22 44.8	116.61
12	22 59 15.26	11 13 2.1	106.21	12	0 30 32.71	2 11 5.0	116.66
13	23 1 13.64	11 2 23.6	106.62	13	0 32 23.70	1 59 24.9	116.69
14	23 3 11.78	10 51 42.7	107.02	14	0 34 14.61	1 47 44.7	116.72
15	23 5 9.70	10 40 59.4	107.41	15	0 36 5.45	1 36 4.3	116.75
16	23 7 7.39	10 30 13.8	107.78	16	0 37 56.23	1 24 23.7	116.77
17	23 9 4.85	10 19 26.0	108.15	17	0 39 46.94	1 12 43.1	116.77
18	23 11 2.10	10 8 36.0	108.51	18	0 41 37.60	1 1 2.5	116.77
19	23 12 59.14	9 57 43.9	108.87	19	0 43 28.20	0 49 21.9	116.77
20	23 14 55.96	9 46 49.6	109.22	20	0 45 18.75	0 37 41.3	116.76
21	23 16 52.57	9 35 53.3	109.55	21	0 47 9.25	0 26 0.8	116.74
22	23 18 48.97	9 24 55.0	109.88	22	0 48 59.71	0 14 20.4	116.71
23	23 20 45.17	9 13 54.7	110.20	23	0 50 50.12	S. 0 2 40.3	116.68
24	23 22 41.17	S. 9 2 52.6	110.51	24	0 52 40.48	N. 0 8 59.7	116.64



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SATURDAY 5.</b>				<b>MONDAY 7.</b>			
0	<sup>h</sup> 0 <sup>m</sup> 52 <sup>s</sup> 40' 48"	N. 0 8 59' 7"	116' 64"	0	<sup>h</sup> 2 <sup>m</sup> 21 <sup>s</sup> 10' 96"	N. 9 11 28' 6"	106' 80"
1	0 54 30' 82"	0 20 39' 4"	116' 59"	1	2 23 3' 02"	9 22 8' 3"	106' 43"
2	0 56 21' 12"	0 32 18' 8"	116' 54"	2	2 24 55' 18"	9 32 45' 7"	106' 04"
3	0 58 11' 39"	0 43 57' 9"	116' 48"	3	2 26 47' 45"	9 43 20' 8"	105' 66"
4	1 0 1' 64"	0 55 36' 5"	116' 41"	4	2 28 39' 82"	9 53 53' 6"	105' 27"
5	1 1 51' 86"	1 7 14' 8"	116' 34"	5	2 30 32' 30"	10 4 24' 0"	104' 87"
6	1 3 42' 06"	1 18 52' 6"	116' 26"	6	2 32 24' 90"	10 14 52' 0"	104' 47"
7	1 5 32' 24"	1 30 29' 9"	116' 17"	7	2 34 17' 61"	10 25 17' 6"	104' 05"
8	1 7 22' 41"	1 42 6' 7"	116' 08"	8	2 36 10' 43"	10 35 40' 6"	103' 63"
9	1 9 12' 57"	1 53 42' 9"	115' 98"	9	2 38 3' 37"	10 46 1' 1"	103' 21"
10	1 11 2' 72"	2 5 18' 5"	115' 87"	10	2 39 56' 43"	10 56 19' 1"	102' 78"
11	1 12 52' 86"	2 16 53' 4"	115' 76"	11	2 41 49' 61"	11 6 34' 4"	102' 33"
12	1 14 42' 99"	2 28 27' 6"	115' 64"	12	2 43 42' 91"	11 16 47' 0"	101' 88"
13	1 16 33' 13"	2 40 1' 1"	115' 51"	13	2 45 36' 34"	11 26 56' 9"	101' 43"
14	1 18 23' 27"	2 51 33' 7"	115' 37"	14	2 47 29' 90"	11 37 4' 1"	100' 97"
15	1 20 13' 42"	3 3 5' 5"	115' 23"	15	2 49 23' 59"	11 47 8' 5"	100' 50"
16	1 22 3' 58"	3 14 36' 5"	115' 09"	16	2 51 17' 42"	11 57 10' 1"	100' 02"
17	1 23 53' 75"	3 26 6' 6"	114' 93"	17	2 53 11' 38"	12 7 8' 7"	99' 53"
18	1 25 43' 94"	3 37 35' 7"	114' 77"	18	2 55 5' 47"	12 17 4' 5"	99' 05"
19	1 27 34' 14"	3 49 3' 9"	114' 61"	19	2 56 59' 70"	12 26 57' 4"	98' 56"
20	1 29 24' 37"	4 0 31' 0"	114' 43"	20	2 58 54' 07"	12 36 47' 2"	98' 05"
21	1 31 14' 62"	4 11 57' 1"	114' 25"	21	3 0 48' 59"	12 46 34' 0"	97' 54"
22	1 33 4' 90"	4 23 22' 0"	114' 06"	22	3 2 43' 25"	12 56 17' 7"	97' 02"
23	1 34 55' 21"	N. 4 34 45' 8"	113' 86"	23	3 4 38' 05"	N. 13 5 58' 3"	96' 50"
<b>SUNDAY 6.</b>				<b>TUESDAY 8.</b>			
0	1 36 45' 55"	N. 4 46 8' 3"	113' 65"	0	3 6 32' 99"	N. 13 15 35' 7"	95' 97"
1	1 38 35' 93"	4 57 29' 6"	113' 45"	1	3 8 28' 09"	13 25 9' 9"	95' 43"
2	1 40 26' 34"	5 8 49' 7"	113' 24"	2	3 10 23' 34"	13 34 40' 9"	94' 89"
3	1 42 16' 80"	5 20 8' 5"	113' 02"	3	3 12 18' 74"	13 44 8' 6"	94' 33"
4	1 44 7' 31"	5 31 26' 0"	112' 79"	4	3 14 14' 30"	13 53 32' 9"	93' 77"
5	1 45 57' 86"	5 42 42' 0"	112' 55"	5	3 16 10' 01"	14 2 53' 9"	93' 21"
6	1 47 48' 46"	5 53 56' 6"	112' 32"	6	3 18 5' 88"	14 12 11' 4"	92' 63"
7	1 49 39' 12"	6 5 9' 8"	112' 07"	7	3 20 1' 91"	14 21 25' 5"	92' 06"
8	1 51 29' 83"	6 16 21' 4"	111' 81"	8	3 21 58' 10"	14 30 36' 1"	91' 48"
9	1 53 20' 60"	6 27 31' 5"	111' 55"	9	3 23 54' 45"	14 39 43' 2"	90' 88"
10	1 55 11' 43"	6 38 40' 0"	111' 28"	10	3 25 50' 97"	14 48 46' 6"	90' 27"
11	1 57 2' 32"	6 49 46' 9"	111' 01"	11	3 27 47' 65"	14 57 46' 4"	89' 67"
12	1 58 53' 29"	7 0 52' 1"	110' 73"	12	3 29 44' 50"	15 6 42' 6"	89' 05"
13	2 0 44' 32"	7 11 55' 6"	110' 43"	13	3 31 41' 51"	15 15 35' 0"	88' 43"
14	2 2 35' 42"	7 22 57' 3"	110' 13"	14	3 33 38' 69"	15 24 23' 7"	87' 80"
15	2 4 26' 60"	7 33 57' 2"	109' 83"	15	3 35 36' 04"	15 33 8' 6"	87' 17"
16	2 6 17' 85"	7 44 55' 2"	109' 52"	16	3 37 33' 56"	15 41 49' 7"	86' 52"
17	2 8 9' 18"	7 55 51' 4"	109' 21"	17	3 39 31' 26"	15 50 26' 8"	85' 87"
18	2 10 0' 60"	8 6 45' 7"	108' 88"	18	3 41 29' 12"	15 59 0' 1"	85' 22"
19	2 11 52' 10"	8 17 38' 0"	108' 55"	19	3 43 27' 16"	16 7 29' 4"	84' 55"
20	2 13 43' 69"	8 28 28' 3"	108' 21"	20	3 45 25' 38"	16 15 54' 7"	83' 88"
21	2 15 35' 36"	8 39 16' 5"	107' 87"	21	3 47 23' 77"	16 24 15' 9"	83' 19"
22	2 17 27' 13"	8 50 2' 7"	107' 52"	22	3 49 22' 34"	16 32 33' 0"	82' 51"
23	2 19 19' 00"	9 0 46' 7"	107' 16"	23	3 51 21' 08"	16 40 46' 0"	81' 82"
24	2 21 10' 96"	N. 9 11 28' 6"	106' 80"	24	3 53 20' 01"	N. 16 48 54' 8"	81' 12"



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10m.
<b>WEDNESDAY 9.</b>				<b>FRIDAY 11.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	3 53 20.01	N.16 48 54.8	81.12	0	5 32 3.57	N.21 45 4.8	39.86
1	3 55 19.12	16 56 59.4	80.42	1	5 34 11.31	21 49 0.9	38.85
2	3 57 18.40	17 4 59.8	79.71	2	5 36 19.20	21 52 51.0	37.84
3	3 59 17.87	17 12 55.9	78.98	3	5 38 27.25	21 56 35.0	36.82
4	4 1 17.52	17 20 47.6	78.25	4	5 40 35.46	22 0 12.9	35.80
5	4 3 17.35	17 28 34.9	77.52	5	5 42 43.82	22 3 44.6	34.78
6	4 5 17.36	17 36 17.9	76.78	6	5 44 52.33	22 7 10.2	33.75
7	4 7 17.56	17 43 56.4	76.03	7	5 47 1.00	22 10 29.6	32.71
8	4 9 17.95	17 51 30.3	75.28	8	5 49 9.81	22 13 42.7	31.67
9	4 11 18.51	17 58 59.8	74.52	9	5 51 18.77	22 16 49.6	30.63
10	4 13 19.26	18 6 24.6	73.75	10	5 53 27.88	22 19 50.2	29.58
11	4 15 20.20	18 13 44.8	72.97	11	5 55 37.13	22 22 44.5	28.53
12	4 17 21.32	18 21 0.3	72.19	12	5 57 46.52	22 25 32.5	27.47
13	4 19 22.63	18 28 11.1	71.41	13	5 59 56.05	22 28 14.1	26.41
14	4 21 24.12	18 35 17.2	70.62	14	6 2 5.72	22 30 49.4	25.34
15	4 23 25.80	18 42 18.5	69.82	15	6 4 15.52	22 33 18.2	24.27
16	4 25 27.66	18 49 15.0	69.01	16	6 6 25.46	22 35 40.6	23.20
17	4 27 29.71	18 56 6.6	68.19	17	6 8 35.52	22 37 56.6	22.12
18	4 29 31.95	19 2 53.3	67.37	18	6 10 45.71	22 40 6.0	21.03
19	4 31 34.37	19 9 35.0	66.54	19	6 12 56.03	22 42 9.0	19.95
20	4 33 36.98	19 16 11.8	65.72	20	6 15 6.48	22 44 5.4	18.86
21	4 35 39.78	19 22 43.6	64.87	21	6 17 17.04	22 45 55.3	17.76
22	4 37 42.76	19 29 10.2	64.02	22	6 19 27.72	22 47 38.5	16.66
23	4 39 45.92	N.19 35 31.8	63.17	23	6 21 38.52	N.22 49 15.2	15.57
<b>THURSDAY 10.</b>				<b>SATURDAY 12.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	4 41 49.27	N.19 41 48.2	62.31	0	6 23 49.44	N.22 50 45.3	14.46
1	4 43 52.81	19 47 59.5	61.44	1	6 26 0.47	22 52 8.7	13.35
2	4 45 56.53	19 54 5.5	60.57	2	6 28 11.61	22 53 25.5	12.24
3	4 48 0.43	20 0 6.3	59.69	3	6 30 22.86	22 54 35.6	11.13
4	4 50 4.52	20 6 1.8	58.81	4	6 32 34.21	22 55 39.0	10.01
5	4 52 8.80	20 11 52.0	57.92	5	6 34 45.66	22 56 35.7	8.89
6	4 54 13.25	20 17 36.8	57.02	6	6 36 57.21	22 57 25.7	7.77
7	4 56 17.89	20 23 16.2	56.12	7	6 39 8.86	22 58 9.0	6.64
8	4 58 22.70	20 28 50.2	55.20	8	6 41 20.61	22 58 45.4	5.51
9	5 0 27.70	20 34 18.6	54.28	9	6 43 32.44	22 59 15.1	4.38
10	5 2 32.87	20 39 41.6	53.37	10	6 45 44.37	22 59 38.0	3.25
11	5 4 38.23	20 44 59.0	52.44	11	6 47 56.38	22 59 54.1	2.12
12	5 6 43.76	20 50 10.9	51.51	12	6 50 8.48	23 0 3.4	0.98
13	5 8 49.47	20 55 17.1	50.57	13	6 52 20.66	23 0 5.9	0.16
14	5 10 55.35	21 0 17.7	49.62	14	6 54 32.92	23 0 1.5	1.31
15	5 13 1.41	21 5 12.6	48.67	15	6 56 45.25	22 59 50.2	2.45
16	5 15 7.64	21 10 1.7	47.71	16	6 58 57.66	22 59 32.1	3.59
17	5 17 14.04	21 14 45.1	46.75	17	7 1 10.14	22 59 7.1	4.74
18	5 19 20.62	21 19 22.7	45.78	18	7 3 22.69	22 58 35.2	5.89
19	5 21 27.36	21 23 54.5	44.81	19	7 5 35.30	22 57 56.4	7.04
20	5 23 34.27	21 28 20.4	43.83	20	7 7 47.98	22 57 10.7	8.19
21	5 25 41.35	21 32 40.4	42.84	21	7 10 0.71	22 56 18.1	9.35
22	5 27 48.59	21 36 54.5	41.85	22	7 12 13.51	22 55 18.5	10.51
23	5 29 56.00	21 41 2.6	40.86	23	7 14 26.36	22 54 12.0	11.66
24	5 32 3.57	N.21 45 4.8	39.86	24	7 16 39.26	N.22 52 58.6	12.82



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 13.</b>				<b>TUESDAY 15.</b>			
0	7 <sup>h</sup> 16 <sup>m</sup> 39 <sup>s</sup> 26	N. 22° 52' 58".6	12".82	0	9 <sup>h</sup> 3 <sup>m</sup> 13 <sup>s</sup> 82	N. 19° 38' 35".2	67".61
1	7 18 52 21	22 51 38 2	13".98	1	9 5 26 56	19 31 46 3	68".70
2	7 21 5 21	22 50 10 9	15".13	2	9 7 39 26	19 24 50 8	69".78
3	7 23 18 26	22 48 36 6	16".29	3	9 9 51 91	19 17 48 9	70".86
4	7 25 31 35	22 46 55 4	17".46	4	9 12 4 52	19 10 40 5	71".93
5	7 27 44 47	22 45 7 1	18".62	5	9 14 17 09	19 3 25 7	73".00
6	7 29 57 63	22 43 11 9	19".78	6	9 16 29 61	18 56 4 5	74".07
7	7 32 10 83	22 41 9 8	20".93	7	9 18 42 09	18 48 36 9	75".13
8	7 34 24 06	22 39 0 7	22".10	8	9 20 54 52	18 41 3 0	76".18
9	7 36 37 32	22 36 44 6	23".27	9	9 23 6 90	18 33 22 7	77".24
10	7 38 50 61	22 34 21 5	24".43	10	9 25 19 24	18 25 36 1	78".28
11	7 41 3 92	22 31 51 5	25".58	11	9 27 31 53	18 17 43 3	79".32
12	7 43 17 25	22 29 14 5	26".75	12	9 29 43 78	18 9 44 3	80".36
13	7 45 30 61	22 26 30 5	27".91	13	9 31 55 98	18 1 39 0	81".40
14	7 47 43 98	22 23 39 6	29".07	14	9 34 8 13	17 53 27 5	82".43
15	7 49 57 36	22 20 41 7	30".23	15	9 36 20 23	17 45 9 9	83".44
16	7 52 10 76	22 17 36 8	31".39	16	9 38 32 28	17 36 46 2	84".47
17	7 54 24 16	22 14 25 0	32".55	17	9 40 44 29	17 28 16 3	85".48
18	7 56 37 58	22 11 6 2	33".71	18	9 42 56 25	17 19 40 4	86".48
19	7 58 51 00	22 7 40 5	34".87	19	9 45 8 16	17 10 58 5	87".49
20	8 1 4 42	22 4 7 8	36".03	20	9 47 20 03	17 2 10 5	88".49
21	8 3 17 85	22 0 28 2	37".18	21	9 49 31 85	16 53 16 6	89".48
22	8 5 31 27	21 56 41 6	38".34	22	9 51 43 62	16 44 16 8	90".46
23	8 7 44 69	N. 21° 52' 48".1	39".48	23	9 53 55 35	N. 16° 35' 11".1	91".44
<b>MONDAY 14.</b>				<b>WEDNESDAY 16.</b>			
0	8 9 58 10	N. 21° 48' 47".8	40".63	0	9 56 7 03	N. 16° 25' 59".5	92".42
1	8 12 11 51	21 44 40 5	41".79	1	9 58 18 67	16 16 42 1	93".38
2	8 14 24 91	21 40 26 3	42".94	2	10 0 30 27	16 7 18 9	94".34
3	8 16 38 29	21 36 5 2	44".09	3	10 2 41 82	15 57 50 0	95".30
4	8 18 51 67	21 31 37 2	45".23	4	10 4 53 34	15 48 15 3	96".25
5	8 21 5 03	21 27 2 4	46".38	5	10 7 4 81	15 38 34 9	97".19
6	8 23 18 37	21 22 20 7	47".52	6	10 9 16 24	15 28 49 0	98".13
7	8 25 31 69	21 17 32 2	48".65	7	10 11 27 64	15 18 57 4	99".07
8	8 27 44 99	21 12 36 9	49".79	8	10 13 38 99	15 9 0 2	99".99
9	8 29 58 27	21 7 34 7	50".93	9	10 15 50 31	14 58 57 5	100".91
10	8 32 11 52	21 2 25 7	52".06	10	10 18 1 59	14 48 49 3	101".82
11	8 34 24 75	20 57 10 0	53".18	11	10 20 12 84	14 38 35 7	102".72
12	8 36 37 96	20 51 47 5	54".32	12	10 22 24 05	14 28 16 7	103".62
13	8 38 51 13	20 46 18 2	55".44	13	10 24 35 23	14 17 52 3	104".51
14	8 41 4 28	20 40 42 2	56".56	14	10 26 46 38	14 7 22 6	105".39
15	8 43 17 39	20 34 59 5	57".68	15	10 28 57 51	13 56 47 6	106".27
16	8 45 30 47	20 29 10 0	58".80	16	10 31 8 60	13 46 7 4	107".13
17	8 47 43 52	20 23 13 9	59".91	17	10 33 19 67	13 35 22 0	107".99
18	8 49 56 54	20 17 11 1	61".02	18	10 35 30 72	13 24 31 5	108".85
19	8 52 9 51	20 11 1 6	62".13	19	10 37 41 74	13 13 35 8	109".70
20	8 54 22 45	20 4 45 5	63".23	20	10 39 52 74	13 2 35 1	110".53
21	8 56 35 35	19 58 22 8	64".33	21	10 42 3 72	12 51 29 4	111".37
22	8 58 48 22	19 51 53 5	65".43	22	10 44 14 68	12 40 18 7	112".19
23	9 1 1 04	19 45 17 6	66".52	23	10 46 25 63	12 29 3 1	113".00
24	9 3 13 82	N. 19° 38' 35".2	67".61	24	10 48 36 57	N. 12° 17' 42".7	113".81



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 17.</b>				<b>SATURDAY 19.</b>			
0	<sup>h</sup> 10 <sup>m</sup> 48 <sup>s</sup> 36 <sup>.57</sup>	N. 12° 17' 42 <sup>.7</sup>	113 <sup>.81</sup>	0	<sup>h</sup> 12 <sup>m</sup> 33 <sup>s</sup> 53 <sup>.82</sup>	N. 1° 56' 8 <sup>.9</sup>	141 <sup>.03</sup>
1	10 50 47 <sup>.49</sup>	12 6 17 <sup>.4</sup>	114 <sup>.61</sup>	1	12 36 7 <sup>.30</sup>	1 42 1 <sup>.8</sup>	141 <sup>.32</sup>
2	10 52 58 <sup>.41</sup>	11 54 47 <sup>.4</sup>	115 <sup>.40</sup>	2	12 38 20 <sup>.92</sup>	1 27 53 <sup>.0</sup>	141 <sup>.59</sup>
3	10 55 9 <sup>.31</sup>	11 43 12 <sup>.6</sup>	116 <sup>.18</sup>	3	12 40 34 <sup>.67</sup>	1 13 42 <sup>.7</sup>	141 <sup>.83</sup>
4	10 57 20 <sup>.21</sup>	11 31 33 <sup>.2</sup>	116 <sup>.96</sup>	4	12 42 48 <sup>.56</sup>	0 59 31 <sup>.0</sup>	142 <sup>.07</sup>
5	10 59 31 <sup>.11</sup>	11 19 49 <sup>.1</sup>	117 <sup>.73</sup>	5	12 45 2 <sup>.59</sup>	0 45 17 <sup>.9</sup>	142 <sup>.30</sup>
6	11 1 42 <sup>.00</sup>	11 8 0 <sup>.4</sup>	118 <sup>.48</sup>	6	12 47 16 <sup>.76</sup>	0 31 3 <sup>.4</sup>	142 <sup>.51</sup>
7	11 3 52 <sup>.90</sup>	10 56 7 <sup>.3</sup>	119 <sup>.23</sup>	7	12 49 31 <sup>.08</sup>	0 16 47 <sup>.8</sup>	142 <sup>.69</sup>
8	11 6 3 <sup>.80</sup>	10 44 9 <sup>.7</sup>	119 <sup>.97</sup>	8	12 51 45 <sup>.56</sup>	N. 0 2 31 <sup>.1</sup>	142 <sup>.87</sup>
9	11 8 14 <sup>.71</sup>	10 32 7 <sup>.7</sup>	120 <sup>.70</sup>	9	12 54 0 <sup>.19</sup>	S. 0 11 46 <sup>.7</sup>	143 <sup>.04</sup>
10	11 10 25 <sup>.62</sup>	10 20 1 <sup>.3</sup>	121 <sup>.43</sup>	10	12 56 14 <sup>.97</sup>	0 26 5 <sup>.4</sup>	143 <sup>.18</sup>
11	11 12 36 <sup>.54</sup>	10 7 50 <sup>.6</sup>	122 <sup>.14</sup>	11	12 58 29 <sup>.92</sup>	0 40 24 <sup>.9</sup>	143 <sup>.32</sup>
12	11 14 47 <sup>.48</sup>	9 55 35 <sup>.6</sup>	122 <sup>.84</sup>	12	13 0 45 <sup>.04</sup>	0 54 45 <sup>.2</sup>	143 <sup>.43</sup>
13	11 16 58 <sup>.43</sup>	9 43 16 <sup>.5</sup>	123 <sup>.53</sup>	13	13 3 0 <sup>.32</sup>	1 9 6 <sup>.1</sup>	143 <sup>.54</sup>
14	11 19 9 <sup>.40</sup>	9 30 53 <sup>.2</sup>	124 <sup>.22</sup>	14	13 5 15 <sup>.78</sup>	1 23 27 <sup>.7</sup>	143 <sup>.63</sup>
15	11 21 20 <sup>.39</sup>	9 18 25 <sup>.9</sup>	124 <sup>.89</sup>	15	13 7 31 <sup>.42</sup>	1 37 49 <sup>.7</sup>	143 <sup>.69</sup>
16	11 23 31 <sup>.41</sup>	9 5 54 <sup>.5</sup>	125 <sup>.56</sup>	16	13 9 47 <sup>.23</sup>	1 52 12 <sup>.0</sup>	143 <sup>.75</sup>
17	11 25 42 <sup>.45</sup>	8 53 19 <sup>.2</sup>	126 <sup>.21</sup>	17	13 12 3 <sup>.23</sup>	2 6 34 <sup>.7</sup>	143 <sup>.80</sup>
18	11 27 53 <sup>.52</sup>	8 40 40 <sup>.0</sup>	126 <sup>.86</sup>	18	13 14 19 <sup>.41</sup>	2 20 57 <sup>.6</sup>	143 <sup>.82</sup>
19	11 30 4 <sup>.62</sup>	8 27 56 <sup>.9</sup>	127 <sup>.49</sup>	19	13 16 35 <sup>.78</sup>	2 35 20 <sup>.5</sup>	143 <sup>.82</sup>
20	11 32 15 <sup>.75</sup>	8 15 10 <sup>.1</sup>	128 <sup>.12</sup>	20	13 18 52 <sup>.35</sup>	2 49 43 <sup>.4</sup>	143 <sup>.82</sup>
21	11 34 26 <sup>.92</sup>	8 2 19 <sup>.5</sup>	128 <sup>.74</sup>	21	13 21 9 <sup>.11</sup>	3 4 6 <sup>.3</sup>	143 <sup>.79</sup>
22	11 36 38 <sup>.13</sup>	7 49 25 <sup>.2</sup>	129 <sup>.34</sup>	22	13 23 26 <sup>.07</sup>	3 18 28 <sup>.9</sup>	143 <sup>.75</sup>
23	11 38 49 <sup>.39</sup>	N. 7 36 27 <sup>.4</sup>	129 <sup>.93</sup>	23	13 25 43 <sup>.24</sup>	S. 3 32 51 <sup>.3</sup>	143 <sup>.69</sup>
<b>FRIDAY 18.</b>				<b>SUNDAY 20.</b>			
0	11 41 0 <sup>.69</sup>	N. 7 23 26 <sup>.0</sup>	130 <sup>.52</sup>	0	13 28 0 <sup>.62</sup>	S. 3 47 13 <sup>.2</sup>	143 <sup>.61</sup>
1	11 43 12 <sup>.04</sup>	7 10 21 <sup>.2</sup>	131 <sup>.09</sup>	1	13 30 18 <sup>.20</sup>	4 1 34 <sup>.6</sup>	143 <sup>.52</sup>
2	11 45 23 <sup>.44</sup>	6 57 12 <sup>.9</sup>	131 <sup>.66</sup>	2	13 32 36 <sup>.00</sup>	4 15 55 <sup>.5</sup>	143 <sup>.41</sup>
3	11 47 34 <sup>.90</sup>	6 44 1 <sup>.3</sup>	132 <sup>.21</sup>	3	13 34 54 <sup>.01</sup>	4 30 15 <sup>.6</sup>	143 <sup>.28</sup>
4	11 49 46 <sup>.41</sup>	6 30 46 <sup>.4</sup>	132 <sup>.75</sup>	4	13 37 12 <sup>.24</sup>	4 44 34 <sup>.9</sup>	143 <sup>.14</sup>
5	11 51 57 <sup>.99</sup>	6 17 28 <sup>.3</sup>	133 <sup>.28</sup>	5	13 39 30 <sup>.70</sup>	4 58 53 <sup>.3</sup>	142 <sup>.98</sup>
6	11 54 9 <sup>.63</sup>	6 4 7 <sup>.1</sup>	133 <sup>.79</sup>	6	13 41 49 <sup>.38</sup>	5 13 10 <sup>.7</sup>	142 <sup>.80</sup>
7	11 56 21 <sup>.34</sup>	5 50 42 <sup>.8</sup>	134 <sup>.30</sup>	7	13 44 8 <sup>.29</sup>	5 27 26 <sup>.9</sup>	142 <sup>.60</sup>
8	11 58 33 <sup>.11</sup>	5 37 15 <sup>.5</sup>	134 <sup>.80</sup>	8	13 46 27 <sup>.43</sup>	5 41 41 <sup>.9</sup>	142 <sup>.39</sup>
9	12 0 44 <sup>.96</sup>	5 23 45 <sup>.2</sup>	135 <sup>.28</sup>	9	13 48 46 <sup>.80</sup>	5 55 55 <sup>.6</sup>	142 <sup>.17</sup>
10	12 2 56 <sup>.89</sup>	5 10 12 <sup>.1</sup>	135 <sup>.76</sup>	10	13 51 6 <sup>.41</sup>	6 10 7 <sup>.9</sup>	141 <sup>.92</sup>
11	12 5 8 <sup>.90</sup>	4 56 36 <sup>.1</sup>	136 <sup>.22</sup>	11	13 53 26 <sup>.26</sup>	6 24 18 <sup>.6</sup>	141 <sup>.64</sup>
12	12 7 20 <sup>.99</sup>	4 42 57 <sup>.5</sup>	136 <sup>.66</sup>	12	13 55 46 <sup>.36</sup>	6 38 27 <sup>.6</sup>	141 <sup>.36</sup>
13	12 9 33 <sup>.17</sup>	4 29 16 <sup>.2</sup>	137 <sup>.10</sup>	13	13 58 6 <sup>.70</sup>	6 52 34 <sup>.9</sup>	141 <sup>.05</sup>
14	12 11 45 <sup>.44</sup>	4 15 32 <sup>.3</sup>	137 <sup>.52</sup>	14	14 0 27 <sup>.28</sup>	7 6 40 <sup>.2</sup>	140 <sup>.72</sup>
15	12 13 57 <sup>.80</sup>	4 1 46 <sup>.0</sup>	137 <sup>.93</sup>	15	14 2 48 <sup>.12</sup>	7 20 43 <sup>.5</sup>	140 <sup>.38</sup>
16	12 16 10 <sup>.26</sup>	3 47 57 <sup>.2</sup>	138 <sup>.33</sup>	16	14 5 9 <sup>.21</sup>	7 34 44 <sup>.8</sup>	140 <sup>.03</sup>
17	12 18 22 <sup>.82</sup>	3 34 6 <sup>.0</sup>	138 <sup>.72</sup>	17	14 7 30 <sup>.56</sup>	7 48 43 <sup>.9</sup>	139 <sup>.65</sup>
18	12 20 35 <sup>.48</sup>	3 20 12 <sup>.6</sup>	139 <sup>.08</sup>	18	14 9 52 <sup>.16</sup>	8 2 40 <sup>.6</sup>	139 <sup>.25</sup>
19	12 22 48 <sup>.25</sup>	3 6 17 <sup>.0</sup>	139 <sup>.44</sup>	19	14 12 14 <sup>.02</sup>	8 16 34 <sup>.9</sup>	138 <sup>.83</sup>
20	12 25 1 <sup>.13</sup>	2 52 19 <sup>.3</sup>	139 <sup>.78</sup>	20	14 14 36 <sup>.15</sup>	8 30 26 <sup>.6</sup>	138 <sup>.39</sup>
21	12 27 14 <sup>.12</sup>	2 38 19 <sup>.6</sup>	140 <sup>.12</sup>	21	14 16 58 <sup>.54</sup>	8 44 15 <sup>.6</sup>	137 <sup>.94</sup>
22	12 29 27 <sup>.24</sup>	2 24 17 <sup>.8</sup>	140 <sup>.45</sup>	22	14 19 21 <sup>.20</sup>	8 58 1 <sup>.9</sup>	137 <sup>.47</sup>
23	12 31 40 <sup>.47</sup>	2 10 14 <sup>.2</sup>	140 <sup>.75</sup>	23	14 21 44 <sup>.13</sup>	9 11 45 <sup>.3</sup>	136 <sup>.98</sup>
24	12 33 53 <sup>.82</sup>	N. 1 56 8 <sup>.9</sup>	141 <sup>.03</sup>	24	14 24 7 <sup>.32</sup>	S. 9 25 25 <sup>.7</sup>	136 <sup>.47</sup>



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 21.</b>				<b>WEDNESDAY 23.</b>			
0	h m s	S. ° ' "	"	0	h m s	S. ° ' "	"
1	14 24 7.32	9 25 25.7	136.47	1	16 24 9.83	18 45 22.7	89.83
2	14 26 30.79	9 39 2.9	135.93	2	16 26 46.28	18 54 17.5	88.43
3	14 28 54.53	9 52 36.9	135.39	3	16 29 22.95	19 3 3.8	87.02
4	14 31 18.55	10 6 7.6	134.82	4	16 31 59.83	19 11 41.7	85.60
5	14 33 42.85	10 19 34.8	134.23	5	16 34 36.90	19 20 11.0	84.17
6	14 36 7.42	10 32 58.4	133.62	6	16 37 14.17	19 28 31.7	82.73
7	14 38 32.28	10 46 18.3	133.00	7	16 39 51.63	19 36 43.7	81.27
8	14 40 57.42	10 59 34.4	132.35	8	16 42 29.27	19 44 46.9	79.79
9	14 43 22.84	11 12 46.5	131.68	9	16 45 7.09	19 52 41.2	78.31
10	14 45 48.54	11 25 54.6	131.00	10	16 47 45.08	20 0 26.6	76.82
11	14 48 14.53	11 38 58.5	130.30	11	16 50 23.24	20 8 3.0	75.31
12	14 50 40.80	11 51 58.2	129.58	12	16 53 1.56	20 15 30.3	73.79
13	14 53 7.36	12 4 53.5	128.84	13	16 55 40.03	20 22 48.5	72.27
14	14 55 34.21	12 17 44.3	128.08	14	16 58 18.66	20 29 57.5	70.72
15	14 58 1.34	12 30 30.4	127.29	15	17 0 57.42	20 36 57.1	69.17
16	15 0 28.77	12 43 11.8	126.49	16	17 3 36.32	20 43 47.5	67.62
17	15 2 56.48	12 55 48.3	125.67	17	17 6 15.35	20 50 28.5	66.04
18	15 5 24.48	13 8 19.8	124.83	18	17 8 54.50	20 57 0.0	64.46
19	15 7 52.76	13 20 46.3	123.97	19	17 11 33.76	21 3 22.0	62.87
20	15 10 21.34	13 33 7.5	123.10	20	17 14 13.13	21 9 34.5	61.28
21	15 12 50.20	13 45 23.5	122.20	21	17 16 52.59	21 15 37.4	59.68
22	15 15 19.35	13 57 34.0	121.28	22	17 19 32.15	21 21 30.7	58.07
23	15 17 48.79	14 9 38.9	120.35	23	17 22 11.80	21 27 14.3	56.46
24	15 20 18.52	S. 14 21 38.2	119.40	24	17 24 51.52	S. 21 32 48.2	54.83
<b>TUESDAY 22.</b>				<b>THURSDAY 24.</b>			
0	15 22 48.53	S. 14 33 31.7	118.42	0	17 27 31.31	S. 21 38 12.3	53.20
1	15 25 18.83	14 45 19.3	117.43	1	17 30 11.16	21 43 26.6	51.56
2	15 27 49.41	14 57 0.9	116.42	2	17 32 51.06	21 48 31.0	49.92
3	15 30 20.27	15 8 36.4	115.40	3	17 35 31.01	21 53 25.6	48.28
4	15 32 51.41	15 20 5.7	114.36	4	17 38 11.00	21 58 10.3	46.63
5	15 35 22.83	15 31 28.7	113.29	5	17 40 51.02	22 2 45.1	44.97
6	15 37 54.53	15 42 45.2	112.20	6	17 43 31.05	22 7 9.9	43.30
7	15 40 26.51	15 53 55.1	111.10	7	17 46 11.10	22 11 24.7	41.63
8	15 42 58.76	16 4 58.4	109.99	8	17 48 51.15	22 15 29.5	39.97
9	15 45 31.28	16 15 55.0	108.86	9	17 51 31.20	22 19 24.4	38.31
10	15 48 4.08	16 26 44.7	107.70	10	17 54 11.24	22 23 9.2	36.63
11	15 50 37.14	16 37 27.4	106.53	11	17 56 51.26	22 26 44.0	34.96
12	15 53 10.46	16 48 3.1	105.35	12	17 59 31.25	22 30 8.7	33.28
13	15 55 44.05	16 58 31.6	104.13	13	18 2 11.20	22 33 23.3	31.60
14	15 58 17.90	17 8 52.7	102.91	14	18 4 51.11	22 36 27.9	29.92
15	16 0 52.00	17 19 6.5	101.68	15	18 7 30.96	22 39 22.4	28.24
16	16 3 26.35	17 29 12.9	100.43	16	18 10 10.75	22 42 6.8	26.56
17	16 6 0.96	17 39 11.6	99.15	17	18 12 50.47	22 44 41.1	24.88
18	16 8 35.81	17 49 2.7	97.87	18	18 15 30.11	22 47 5.4	23.21
19	16 11 10.90	17 58 46.0	96.56	19	18 18 9.66	22 49 19.6	21.53
20	16 13 46.23	18 8 21.4	95.24	20	18 20 49.11	22 51 23.8	19.87
21	16 16 21.79	18 17 48.9	93.91	21	18 23 28.46	22 53 18.0	18.19
22	16 18 57.58	18 27 8.3	92.56	22	18 26 7.70	22 55 2.1	16.52
23	16 21 33.60	18 36 19.6	91.20	23	18 28 46.81	22 56 36.2	14.85
24	16 24 9.83	S. 18 45 22.7	89.83	24	18 31 25.80	S. 22 58 0.3	13.18



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>FRIDAY 25.</b>				<b>SUNDAY 27.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	18 31 25.80	S. 22 58 0.3	13.18	0	20 33 44.97	S. 21 2 57.1	57.24
1	18 34 4.65	22 59 14.4	11.52	1	20 36 9.54	20 57 10.1	58.42
2	18 36 43.35	23 0 18.6	9.87	2	20 38 33.71	20 51 16.0	59.60
3	18 39 21.89	23 1 12.9	8.22	3	20 40 57.48	20 45 14.9	60.76
4	18 42 0.28	23 1 57.2	6.57	4	20 43 20.85	20 39 6.9	61.91
5	18 44 38.49	23 2 31.7	4.92	5	20 45 43.81	20 32 52.0	63.04
6	18 47 16.52	23 2 56.3	3.29	6	20 48 6.37	20 26 30.4	64.16
7	18 49 54.37	23 3 11.2	1.66	7	20 50 28.52	20 20 2.1	65.26
8	18 52 32.03	23 3 16.2	0.03	8	20 52 50.26	20 13 27.3	66.35
9	18 55 9.48	23 3 11.5	1.59	9	20 55 11.60	20 6 45.9	67.43
10	18 57 46.73	23 2 57.1	3.21	10	20 57 32.52	19 59 58.1	68.50
11	19 0 23.76	23 2 33.0	4.82	11	20 59 53.04	19 53 3.9	69.55
12	19 3 0.56	23 1 59.3	6.42	12	21 2 13.15	19 46 3.5	70.58
13	19 5 37.13	23 1 16.0	8.01	13	21 4 32.85	19 38 57.0	71.59
14	19 8 13.47	23 0 23.2	9.59	14	21 6 52.13	19 31 44.4	72.60
15	19 10 49.56	22 59 20.9	11.17	15	21 9 11.01	19 24 25.8	73.59
16	19 13 25.39	22 58 9.1	12.74	16	21 11 29.48	19 17 1.3	74.57
17	19 16 0.97	22 56 48.0	14.30	17	21 13 47.54	19 9 30.9	75.55
18	19 18 36.28	22 55 17.5	15.85	18	21 16 5.19	19 1 54.7	76.50
19	19 21 11.32	22 53 37.8	17.39	19	21 18 22.43	18 54 12.9	77.44
20	19 23 46.09	22 51 48.8	18.93	20	21 20 39.27	18 46 25.4	78.37
21	19 26 20.57	22 49 50.6	20.45	21	21 22 55.69	18 38 32.4	79.28
22	19 28 54.75	22 47 43.4	21.96	22	21 25 11.71	18 30 34.0	80.18
23	19 31 28.64	S. 22 45 27.1	23.47	23	21 27 27.33	S. 18 22 30.2	81.07
<b>SATURDAY 26.</b>				<b>MONDAY 28.</b>			
0	19 34 2.23	S. 22 43 1.8	24.96	0	21 29 42.55	S. 18 14 21.1	81.95
1	19 36 35.51	22 40 27.6	26.44	1	21 31 57.36	18 6 6.8	82.82
2	19 39 8.47	22 37 44.5	27.92	2	21 34 11.77	17 57 47.3	83.67
3	19 41 41.11	22 34 52.6	29.38	3	21 36 25.78	17 49 22.8	84.50
4	19 44 13.43	22 31 52.0	30.82	4	21 38 39.40	17 40 53.3	85.32
5	19 46 45.42	22 28 42.8	32.25	5	21 40 52.62	17 32 18.9	86.13
6	19 49 17.08	22 25 25.0	33.68	6	21 43 5.44	17 23 39.7	86.93
7	19 51 48.40	22 21 58.6	35.10	7	21 45 17.87	17 14 55.8	87.72
8	19 54 19.37	22 18 23.8	36.50	8	21 47 29.91	17 6 7.1	88.49
9	19 56 49.99	22 14 40.6	37.90	9	21 49 41.57	16 57 13.9	89.25
10	19 59 20.26	22 10 49.0	39.28	10	21 51 52.83	16 48 16.1	90.00
11	20 1 50.18	22 6 49.2	40.64	11	21 54 3.71	16 39 13.9	90.74
12	20 4 19.73	22 2 41.3	41.99	12	21 56 14.21	16 30 7.2	91.47
13	20 6 48.92	21 58 25.3	43.33	13	21 58 24.33	16 20 56.3	92.17
14	20 9 17.74	21 54 1.3	44.67	14	22 0 34.07	16 11 41.2	92.87
15	20 11 46.18	21 49 29.3	45.98	15	22 2 43.44	16 2 21.9	93.56
16	20 14 14.25	21 44 49.5	47.28	16	22 4 52.43	15 52 58.5	94.24
17	20 16 41.94	21 40 1.9	48.57	17	22 7 1.05	15 43 31.0	94.91
18	20 19 9.25	21 35 6.6	49.86	18	22 9 9.31	15 33 59.6	95.55
19	20 21 36.18	21 30 3.6	51.13	19	22 11 17.20	15 24 24.4	96.18
20	20 24 2.72	21 24 53.1	52.38	20	22 13 24.72	15 14 45.4	96.82
21	20 26 28.87	21 19 35.1	53.62	21	22 15 31.89	15 5 2.6	97.44
22	20 28 54.63	21 14 9.7	54.84	22	22 17 38.71	14 55 16.1	98.05
23	20 31 20.00	21 8 37.0	56.05	23	22 19 45.17	14 45 26.0	98.64
24	20 33 44.97	S. 21 2 57.1	57.24	24	22 21 51.28	S. 14 35 32.4	99.22



MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
TUESDAY 29.				WEDNESDAY 30.			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	22 21 51.28	S. 14 35 32.4	99.22	0	23 10 41.56	S. 10 23 9.1	110.15
1	22 23 57.04	14 25 35.3	99.80	1	23 12 40.03	10 12 7.2	110.48
2	22 26 2.46	14 15 34.8	100.36	2	23 14 38.23	10 1 3.4	110.80
3	22 28 7.54	14 5 31.0	100.90	3	23 16 36.18	9 49 57.6	111.12
4	22 30 12.28	13 55 24.0	101.44	4	23 18 33.88	9 38 50.0	111.43
5	22 32 16.69	13 45 13.7	101.98	5	23 20 31.34	9 27 40.5	111.73
6	22 34 20.77	13 35 0.2	102.50	6	23 22 28.55	9 16 29.2	112.02
7	22 36 24.52	13 24 43.7	103.01	7	23 24 25.52	9 5 16.2	112.30
8	22 38 27.95	13 14 24.1	103.51	8	23 26 22.26	8 54 1.6	112.58
9	22 40 31.05	13 4 1.6	104.00	9	23 28 18.76	8 42 45.3	112.85
10	22 42 33.84	12 53 36.1	104.48	10	23 30 15.04	8 31 27.4	113.11
11	22 44 36.31	12 43 7.8	104.94	11	23 32 11.10	8 20 8.0	113.35
12	22 46 38.48	12 32 36.8	105.39	12	23 34 6.93	8 8 47.2	113.59
13	22 48 40.34	12 22 3.1	105.85	13	23 36 2.55	7 57 24.9	113.83
14	22 50 41.89	12 11 26.6	106.29	14	23 37 57.96	7 46 1.2	114.06
15	22 52 43.14	12 0 47.6	106.71	15	23 39 53.17	7 34 36.2	114.28
16	22 54 44.10	11 50 6.1	107.13	16	23 41 48.17	7 23 9.9	114.49
17	22 56 44.77	11 39 22.1	107.54	17	23 43 42.97	7 11 42.3	114.69
18	22 58 45.15	11 28 35.6	107.94	18	23 45 37.57	7 0 13.6	114.88
19	23 0 45.24	11 17 46.8	108.33	19	23 47 31.99	6 48 43.7	115.07
20	23 2 45.05	11 6 55.7	108.71	20	23 49 26.22	6 37 12.7	115.26
21	23 4 44.58	10 56 2.3	109.08	21	23 51 20.26	6 25 40.6	115.43
22	23 6 43.84	10 45 6.7	109.44	22	23 53 14.12	6 14 7.5	115.59
23	23 8 42.83	10 34 9.0	109.80	23	23 55 7.80	6 2 33.5	115.74
24	23 10 41.56	S. 10 23 9.1	110.15	24	23 57 1.32	S. 5 50 58.6	115.89

PHASES OF THE MOON.

Nov. 7	○	Full Moon	- - - - -	h m
15	☾	Last Quarter	- - - - -	19 31.8
22	●	New Moon	- - - - -	20 58.8
29	☾	First Quarter	- - - - -	13 20.8
			- - - - -	10 33.2

Nov. 8	☾	Apogee	- - - - -	h
22	☾	Perigee	- - - - -	I
			- - - - -	5



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	SUN W.	103 55 9	3113	105 23 3	3127	106 50 40	3142	108 17 59	3155
	Saturn W.	57 40 35	2775	59 15 36	2788	60 50 20	2801	62 24 46	2814
	$\alpha$ Aquilæ W.	39 18 2	4948	40 15 38	4815	41 15 2	4698	42 16 3	4593
	$\alpha$ Pegasi E.	36 20 0	4206	35 11 39	4342	34 5 25	4493	33 1 27	4664
	$\alpha$ Arietis E.	73 54 40	2899	72 22 20	2915	70 50 20	2931	69 18 41	2947
	Aldebaran E.	104 43 46	2747	103 8 9	2760	101 32 49	2774	99 57 47	2786
2	SUN W.	115 30 32	3220	116 56 17	3233	118 21 47	3244	119 47 4	3256
	Saturn W.	70 12 57	2873	71 45 51	2884	73 18 30	2894	74 50 56	2905
	$\alpha$ Aquilæ W.	47 41 2	4215	48 49 14	4161	49 58 17	4112	51 8 7	4069
	$\alpha$ Arietis E.	61 45 29	3029	60 15 52	3045	58 46 35	3062	57 17 39	3080
	Aldebaran E.	92 6 33	2845	90 33 3	2855	88 59 47	2866	87 26 45	2876
	Jupiter E.	110 19 31	2820	108 45 29	2830	107 11 40	2840	105 38 4	2851
3	SUN W.	126 50 11	3309	128 14 12	3319	129 38 2	3329	131 1 40	3338
	Saturn W.	82 29 55	2952	84 1 8	2960	85 32 11	2969	87 3 3	2977
	$\alpha$ Aquilæ W.	57 6 42	3905	58 19 56	3882	59 33 34	3860	60 47 34	3840
	$\alpha$ Arietis E.	49 58 26	3173	48 31 44	3194	47 5 28	3215	45 39 36	3238
	Aldebaran E.	79 44 40	2923	78 12 50	2931	76 41 11	2939	75 9 42	2947
	Jupiter E.	97 53 12	2896	96 20 48	2904	94 48 34	2912	93 16 31	2919
4	Saturn W.	94 35 2	3011	96 5 1	3018	97 34 51	3024	99 4 34	3030
	$\alpha$ Aquilæ W.	67 2 0	3769	68 17 35	3759	69 33 20	3749	70 49 15	3741
	Fomalhaut W.	31 38 52	3773	32 54 22	3718	34 10 50	3668	35 28 11	3624
	$\alpha$ Arietis E.	38 37 35	3376	37 14 51	3411	35 52 47	3449	34 31 26	3492
	Aldebaran E.	67 34 38	2982	66 4 3	2989	64 33 37	2994	63 3 17	3001
	Jupiter E.	85 38 30	2953	84 7 18	2960	82 36 15	2965	81 5 18	2971
5	Saturn W.	106 31 29	3055	108 0 34	3059	109 29 34	3064	110 58 28	3067
	$\alpha$ Aquilæ W.	77 10 39	3714	78 27 12	3711	79 43 47	3709	81 0 25	3707
	Fomalhaut W.	42 4 52	3477	43 25 42	3456	44 46 55	3438	46 8 29	3422
	$\alpha$ Pegasi W.	31 42 37	4956	32 40 7	4805	33 39 39	4672	34 41 2	4553
	Aldebaran E.	55 33 24	3026	54 3 44	3030	52 34 9	3035	51 4 40	3039
	Jupiter E.	73 32 14	2994	72 1 54	2998	70 31 39	3003	69 1 30	3006
	Pollux E.	99 45 16	3042	98 15 55	3047	96 46 40	3051	95 17 30	3054
6	$\alpha$ Aquilæ W.	87 23 48	3708	88 40 26	3710	89 57 3	3712	91 13 37	3716
	Fomalhaut W.	53 0 20	3362	54 23 20	3353	55 46 31	3345	57 9 51	3338
	$\alpha$ Pegasi W.	40 10 30	4133	41 20 0	4073	42 30 28	4018	43 41 50	3969
	Aldebaran E.	43 38 28	3058	42 9 27	3061	40 40 30	3064	39 11 36	3068
	Jupiter E.	61 31 46	3022	60 2 0	3025	58 32 18	3026	57 2 38	3029
	Pollux E.	87 52 42	3070	86 23 56	3073	84 55 14	3075	83 26 34	3078
7	Fomalhaut W.	64 8 25	3309	65 32 26	3304	66 56 33	3300	68 20 44	3296
	$\alpha$ Pegasi W.	49 49 30	3784	51 4 49	3756	52 20 37	3730	53 36 53	3706
	Aldebaran E.	31 48 5	3082	30 19 33	3085	28 51 5	3088	27 22 41	3091
	Jupiter E.	49 34 56	3038	48 5 30	3039	46 36 5	3039	45 6 41	3041
	Pollux E.	76 3 57	3088	74 35 33	3090	73 7 11	3091	71 38 50	3092
	Mars E.	119 10 13	3272	117 45 29	3274	116 20 47	3275	114 56 6	3276
8	Fomalhaut W.	75 22 42	3281	76 47 16	3278	78 11 53	3276	79 36 33	3273
	$\alpha$ Pegasi W.	60 3 53	3612	61 22 15	3596	62 40 53	3582	63 59 47	3570
	$\alpha$ Arietis W.	18 29 36	5064	19 25 41	4786	20 25 29	4559	21 28 29	4373



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	SUN W.	109 45 2	3169	111 11 48	3183	112 38 18	3195	114 4 33	3208
	Saturn W.	63 58 56	2826	65 32 50	2839	67 6 27	2850	68 39 50	2862
	α Aquilæ W.	43 18 34	4500	44 22 26	4417	45 27 32	4342	46 33 46	4275
	α Pegasi E.	31 59 57	4856	31 1 7	5074	30 5 9	5323	29 12 19	5607
	α Arietis E.	67 47 22	2963	66 16 23	2980	64 45 45	2996	63 15 27	3012
	Aldebaran E.	98 23 1	2798	96 48 31	2811	95 14 17	2822	93 40 18	2833
2	SUN W.	121 12 7	3267	122 36 57	3278	124 1 34	3288	125 25 59	3299
	Saturn W.	76 23 8	2915	77 55 8	2925	79 26 55	2934	80 58 31	2943
	α Aquilæ W.	52 18 39	4029	53 29 50	3993	54 41 36	3961	55 53 54	3931
	α Arietis E.	55 49 5	3097	54 20 51	3115	52 53 0	3134	51 25 32	3153
	Aldebaran E.	85 53 55	2886	84 21 18	2896	82 48 54	2905	81 16 41	2914
	Jupiter E.	104 4 42	2860	102 31 32	2869	100 58 34	2878	99 25 47	2887
3	SUN W.	132 25 7	3347	133 48 25	3357	135 11 31	3365	136 34 28	3373
	Saturn W.	88 33 45	2984	90 4 18	2992	91 34 41	2998	93 4 56	3005
	α Aquilæ W.	62 1 55	3823	63 16 33	3808	64 31 27	3793	65 46 37	3780
	α Arietis E.	44 14 12	3262	42 49 16	3287	41 24 50	3314	40 0 55	3344
	Aldebaran E.	73 38 23	2954	72 7 13	2962	70 36 13	2969	69 5 21	2976
	Jupiter E.	91 44 36	2927	90 12 52	2934	88 41 16	2941	87 9 49	2947
4	Saturn W.	100 34 10	3035	102 3 39	3040	103 33 2	3045	105 2 19	3051
	α Aquilæ W.	72 5 19	3734	73 21 30	3728	74 37 48	3723	75 54 11	3718
	Fomalhaut W.	36 46 19	3587	38 5 7	3555	39 24 31	3526	40 44 27	3500
	α Arietis E.	33 10 53	3538	31 51 11	3591	30 32 27	3651	29 14 48	3718
	Aldebaran E.	61 33 5	3006	60 3 0	3012	58 33 2	3017	57 3 10	3022
	Jupiter E.	79 34 29	2976	78 3 46	2981	76 33 9	2986	75 2 39	2990
5	Saturn W.	112 27 18	3071	113 56 3	3074	115 24 44	3078	116 53 21	3081
	α Aquilæ W.	82 17 5	3706	83 33 46	3706	84 50 27	3706	86 7 8	3707
	Fomalhaut W.	47 30 21	3407	48 52 30	3394	50 14 53	3382	51 37 30	3371
	α Pegasi W.	35 44 7	4448	36 48 45	4356	37 54 46	4274	39 2 3	4199
	Aldebaran E.	49 35 16	3043	48 5 57	3047	46 36 43	3051	45 7 33	3055
	Jupiter E.	67 31 25	3009	66 1 24	3013	64 31 28	3016	63 1 35	3019
	Pollux E.	93 48 24	3057	92 19 22	3061	90 50 25	3064	89 21 32	3067
6	α Aquilæ W.	92 30 7	3719	93 46 34	3724	95 2 56	3729	96 19 13	3734
	Fomalhaut W.	58 33 19	3331	59 56 55	3324	61 20 39	3319	62 44 29	3313
	α Pegasi W.	44 54 0	3925	46 6 54	3885	47 20 29	3848	48 34 42	3814
	Aldebaran E.	37 42 47	3070	36 14 1	3073	34 45 19	3076	33 16 40	3079
	Jupiter E.	55 33 1	3031	54 3 27	3033	52 33 55	3034	51 4 25	3035
	Pollux E.	81 57 57	3081	80 29 24	3082	79 0 52	3085	77 32 24	3086
7	Fomalhaut W.	69 45 0	3293	71 9 20	3289	72 33 44	3287	73 58 11	3283
	α Pegasi W.	54 53 34	3684	56 10 38	3664	57 28 3	3645	58 45 49	3628
	Aldebaran E.	25 54 20	3095	24 26 4	3099	22 57 53	3103	21 29 47	3108
	Jupiter E.	43 37 19	3041	42 7 57	3042	40 38 36	3042	39 9 15	3043
	Pollux E.	70 10 31	3094	68 42 14	3095	67 13 58	3096	65 45 44	3097
	Mars E.	113 31 26	3276	112 6 46	3277	110 42 8	3277	109 17 30	3277
8	Fomalhaut W.	81 1 16	3271	82 26 1	3270	83 50 48	3267	85 15 38	3265
	α Pegasi W.	65 18 54	3557	66 38 15	3546	67 57 48	3535	69 17 33	3526
	α Arietis W.	22 34 15	4218	23 42 24	4089	24 52 36	3980	26 4 36	3887



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
8	Jupiter E.	37 39 55	3043	36 10 36	3043	34 41 16	3043	33 11 56	3043
	Pollux E.	64 17 31	3097	62 49 18	3099	61 21 7	3099	59 52 56	3100
	Mars E.	107 52 52	3277	106 28 14	3277	105 3 36	3277	103 38 58	3277
9	Fomalhaut W.	86 40 30	3264	88 5 24	3262	89 30 20	3260	90 55 18	3259
	α Pegasi W.	70 37 28	3516	71 57 34	3507	73 17 50	3499	74 38 15	3491
	α Arietis W.	27 18 9	3807	28 33 4	3739	29 49 10	3679	31 6 20	3626
	Pollux E.	52 32 12	3101	51 4 4	3101	49 35 56	3102	48 7 49	3102
	Regulus E.	88 17 2	3073	86 48 19	3072	85 19 35	3070	83 50 49	3069
	Mars E.	96 35 34	3272	95 10 50	3271	93 46 4	3269	92 21 16	3267
10	α Pegasi W.	81 22 20	3459	82 43 30	3454	84 4 46	3448	85 26 8	3444
	α Arietis W.	37 44 20	3440	39 5 51	3413	40 27 53	3389	41 50 22	3366
	Pollux E.	40 47 15	3104	39 19 10	3104	37 51 5	3105	36 23 1	3106
	Regulus E.	76 26 25	3058	74 57 24	3055	73 28 19	3052	71 59 11	3049
	Mars E.	85 16 40	3254	83 51 35	3252	82 26 27	3249	81 1 16	3245
11	α Pegasi W.	92 14 14	3423	93 36 4	3420	94 57 58	3417	96 19 55	3414
	α Arietis W.	48 48 44	3274	50 13 26	3259	51 38 25	3244	53 3 42	3230
	Aldebaran W.	15 59 8	3079	17 27 43	3066	18 56 34	3054	20 25 40	3043
	Regulus E.	64 32 28	3030	63 2 52	3026	61 33 12	3021	60 3 25	3017
	Mars E.	73 54 11	3225	72 28 31	3219	71 2 44	3214	69 36 52	3209
12	α Arietis W.	60 14 7	3166	61 40 57	3153	63 8 2	3142	64 35 21	3129
	Aldebaran W.	27 54 14	2998	29 24 30	2989	30 54 57	2980	32 25 35	2971
	Regulus E.	52 32 57	2989	51 2 30	2982	49 31 55	2975	48 1 11	2969
	Mars E.	62 25 49	3178	60 59 13	3171	59 32 29	3163	58 5 36	3156
	SUN E.	134 26 43	3377	133 4 0	3368	131 41 7	3359	130 18 4	3350
13	α Arietis W.	71 55 32	3071	73 24 17	3060	74 53 16	3048	76 22 30	3035
	Aldebaran W.	40 1 35	2925	41 33 22	2914	43 5 23	2905	44 37 36	2894
	Jupiter W.	22 35 43	2884	24 8 22	2874	25 51 14	2864	27 14 19	2854
	Regulus E.	40 25 21	2931	38 53 42	2923	37 21 52	2915	35 49 53	2906
	Mars E.	50 48 45	3113	49 20 51	3104	47 52 46	3093	46 24 28	3084
	SUN E.	123 20 7	3301	121 55 57	3291	120 31 35	3280	119 7 0	3268
14	α Arietis W.	83 52 25	2974	85 23 10	2962	86 54 10	2949	88 25 27	2936
	Aldebaran W.	52 22 11	2837	53 55 51	2825	55 29 46	2812	57 3 58	2800
	Jupiter W.	35 3 9	2798	36 37 39	2786	38 12 25	2774	39 47 27	2762
	Regulus E.	28 7 12	2865	26 34 8	2856	25 0 53	2849	23 27 29	2842
	Mars E.	38 59 48	3029	37 30 11	3017	36 0 19	3005	34 30 13	2993
	SUN E.	112 0 37	3207	110 34 36	3194	109 8 20	3180	107 41 47	3166
15	Aldebaran W.	64 59 16	2731	66 35 15	2716	68 11 33	2701	69 48 11	2686
	Jupiter W.	47 46 56	2693	49 23 45	2678	51 0 54	2663	52 38 23	2649
	Pollux W.	21 23 57	2883	22 56 38	2849	24 30 3	2818	26 4 8	2790
	Spica E.	69 38 9	2764	68 2 54	2750	66 27 21	2736	64 51 29	2723
	SUN E.	100 24 43	3092	98 56 23	3076	97 27 44	3060	95 58 45	3043
16	Aldebaran W.	77 56 33	2607	79 35 19	2590	81 14 28	2574	82 53 59	2556
	Jupiter W.	60 50 59	2570	62 30 35	2553	64 10 35	2537	65 50 57	2519
	Pollux W.	34 3 7	2669	35 40 29	2647	37 18 20	2626	38 56 39	2605
	Spica E.	56 47 30	2651	55 9 44	2636	53 31 38	2622	51 53 13	2608
	SUN E.	88 28 39	2957	86 57 32	2939	85 26 3	2921	83 54 11	2903



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
		° ' "		° ' "		° ' "		° ' "	
8	Jupiter E.	31 42 35	3042	30 13 14	3041	28 43 52	3041	27 14 30	3039
	Pollux E.	58 24 46	3101	56 56 37	3101	55 28 28	3101	54 0 20	3101
	Mars E.	102 14 19	3276	100 49 39	3276	99 24 59	3274	98 0 17	3273
9	Fomalhaut W.	92 20 18	3258	93 45 19	3256	95 10 22	3254	96 35 27	3253
	α Pegasi W.	75 58 49	3485	77 19 30	3477	78 40 20	3471	80 1 16	3464
	α Arietis W.	32 24 26	3580	33 43 22	3540	35 3 2	3503	36 23 23	3470
	Pollux E.	46 39 42	3102	45 11 35	3102	43 43 28	3102	42 15 21	3103
	Regulus E.	82 22 1	3067	80 53 11	3065	79 24 18	3063	77 55 23	3061
	Mars E.	90 56 26	3265	89 31 33	3263	88 6 38	3260	86 41 40	3258
10	α Pegasi W.	86 47 35	3439	88 9 8	3435	89 30 45	3431	90 52 27	3426
	α Arietis W.	43 13 18	3345	44 36 37	3326	46 0 19	3308	47 24 21	3290
	Pollux E.	34 54 59	3107	33 26 58	3109	31 59 0	3112	30 31 5	3115
	Regulus E.	70 29 59	3046	69 0 43	3042	67 31 22	3039	66 1 57	3035
	Mars E.	79 36 0	3241	78 10 40	3237	76 45 15	3234	75 19 46	3229
11	α Pegasi W.	97 41 56	3412	99 3 59	3409	100 26 5	3408	101 48 12	3406
	α Arietis W.	54 29 16	3216	55 55 6	3203	57 21 11	3191	58 47 31	3178
	Aldebaran W.	21 55 0	3034	23 24 31	3024	24 54 14	3014	26 24 9	3006
	Regulus E.	58 33 33	3011	57 3 34	3006	55 33 29	3001	54 3 17	2994
	Mars E.	68 10 54	3203	66 44 48	3198	65 18 36	3191	63 52 16	3185
12	α Arietis W.	66 2 55	3118	67 30 43	3106	68 58 45	3095	70 27 1	3083
	Aldebaran W.	33 56 24	2962	35 27 25	2954	36 58 36	2944	38 29 59	2934
	Regulus E.	46 30 19	2962	44 59 19	2954	43 28 9	2947	41 56 50	2939
	Mars E.	56 38 34	3148	55 11 22	3139	53 44 0	3131	52 16 28	3122
	Sun E.	128 54 50	3341	127 31 26	3331	126 7 51	3322	124 44 5	3312
13	α Arietis W.	77 51 59	3023	79 21 43	3012	80 51 41	2999	82 21 55	2986
	Aldebaran W.	46 10 3	2883	47 42 43	2872	49 15 38	2861	50 48 47	2849
	Jupiter W.	28 47 37	2843	30 21 9	2833	31 54 54	2821	33 28 54	2810
	Regulus E.	34 17 42	2898	32 45 21	2890	31 12 49	2881	29 40 6	2873
	Mars E.	44 55 59	3073	43 27 16	3062	41 58 20	3051	40 29 11	3040
	Sun E.	117 42 11	3257	116 17 9	3245	114 51 53	3232	113 26 22	3220
14	α Arietis W.	89 57 0	2924	91 28 49	2911	93 0 54	2898	94 33 16	2884
	Aldebaran W.	58 38 26	2786	60 13 12	2773	61 48 15	2759	63 23 36	2745
	Jupiter W.	41 22 45	2748	42 58 21	2735	44 34 15	2722	46 10 26	2708
	Regulus E.	21 53 56	2837	20 20 16	2833	18 46 31	2831	17 12 43	2832
	Mars E.	32 59 51	2981	31 29 14	2969	29 58 22	2955	28 27 13	2943
	Sun E.	106 14 57	3152	104 47 51	3137	103 20 26	3123	101 52 44	3107
15	Aldebaran W.	71 25 9	2671	73 2 28	2655	74 40 9	2640	76 18 10	2624
	Jupiter W.	54 16 12	2634	55 54 21	2618	57 32 52	2602	59 11 44	2585
	Pollux W.	27 38 49	2763	29 14 6	2738	30 49 55	2714	32 26 16	2692
	Spica E.	63 15 20	2708	61 38 51	2694	60 2 3	2680	58 24 56	2666
	Sun E.	94 29 26	3026	92 59 46	3010	91 29 46	2992	89 59 23	2975
16	Aldebaran W.	84 33 54	2539	86 14 13	2522	87 54 55	2504	89 36 2	2487
	Jupiter W.	67 31 44	2502	69 12 54	2485	70 54 28	2468	72 36 26	2450
	Pollux W.	40 35 27	2585	42 14 43	2564	43 54 27	2544	45 34 40	2525
	Spica E.	50 14 29	2593	48 35 24	2579	46 56 0	2565	45 16 17	2551
	Sun E.	82 21 56	2884	80 49 17	2866	79 16 14	2847	77 42 47	2828



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
17	Aldebaran W.	91 17 34	2470	92 59 30	2452	94 41 51	2434	96 24 37	2416
	Jupiter W.	74 18 50	2433	76 1 38	2415	77 44 51	2397	79 28 30	2380
	Pollux W.	47 15 19	2504	48 56 27	2484	50 38 2	2465	52 20 5	2445
	Spica E.	43 36 15	2538	41 55 54	2526	40 15 17	2513	38 34 22	2502
	SUN E.	76 8 55	2809	74 34 39	2789	72 59 57	2771	71 24 51	2752
18	Jupiter W.	88 13 9	2290	89 59 23	2273	91 46 2	2256	93 33 7	2239
	Pollux W.	60 57 9	2350	62 41 55	2332	64 27 8	2313	66 12 48	2296
	Regulus W.	25 2 22	2361	26 46 53	2339	28 31 56	2318	30 17 30	2298
	Spica E.	30 6 25	2467	28 24 25	2466	26 42 24	2470	25 0 28	2478
	SUN E.	63 23 1	2656	61 45 22	2638	60 7 19	2619	58 28 50	2601
19	Jupiter W.	102 34 51	2155	104 24 26	2139	106 14 25	2124	108 4 47	2109
	Pollux W.	75 7 35	2210	76 55 48	2194	78 44 25	2178	80 33 26	2163
	Regulus W.	39 12 29	2204	41 0 50	2187	42 49 37	2171	44 38 48	2155
	Mars W.	25 37 14	2367	27 21 36	2348	29 6 26	2330	30 51 42	2312
	SUN E.	50 10 18	2514	48 29 24	2497	46 48 7	2482	45 6 28	2467
20	Regulus W.	53 50 32	2083	55 41 58	2071	57 33 42	2058	59 25 46	2047
	Mars W.	39 44 6	2235	41 31 41	2222	43 19 36	2209	45 7 50	2197
	SUN E.	36 33 6	2399	34 49 30	2388	33 5 38	2378	31 21 32	2369
24	SUN W.	20 27 41	2404	22 11 10	2408	23 54 33	2415	25 37 46	2424
	Fomalhaut E.	71 37 43	2264	69 50 51	2281	68 4 24	2300	66 18 24	2319
	α Pegasi E.	88 44 29	2448	87 2 3	2461	85 19 55	2476	83 38 8	2492
25	SUN W.	34 10 4	2487	35 51 35	2503	37 32 44	2519	39 13 31	2536
	Fomalhaut E.	57 36 8	2438	55 53 27	2467	54 11 27	2497	52 30 9	2529
	α Pegasi E.	75 15 25	2592	73 36 19	2617	71 57 47	2642	70 19 50	2669
26	SUN W.	47 31 25	2627	49 9 43	2646	50 47 36	2665	52 25 3	2685
	Fomalhaut E.	44 15 47	2726	42 39 41	2774	41 4 39	2827	39 30 46	2884
	α Pegasi E.	62 19 52	2830	60 46 3	2868	59 13 3	2907	57 40 53	2949
	α Arietis E.	104 13 21	2443	102 30 48	2460	100 48 39	2477	99 6 54	2495
27	SUN W.	60 25 36	2785	62 0 23	2806	63 34 43	2827	65 8 36	2846
	α Pegasi E.	50 14 9	3198	48 47 57	3258	47 22 56	3322	45 59 10	3390
	α Arietis E.	90 44 24	2587	89 5 11	2607	87 26 25	2626	85 48 5	2645
28	SUN W.	72 51 34	2946	74 22 54	2966	75 53 49	2985	77 24 20	3005
	α Pegasi E.	39 21 41	3828	38 7 8	3942	36 54 31	4068	35 43 58	4207
	α Arietis E.	77 43 6	2746	76 7 27	2766	74 32 15	2786	72 57 29	2807
	Aldebaran E.	108 36 6	2599	106 57 10	2617	105 18 38	2635	103 40 31	2652
29	SUN W.	84 51 7	3096	86 19 22	3114	87 47 15	3130	89 14 48	3147
	α Aquilæ W.	45 21 26	4290	46 28 28	4223	47 36 32	4164	48 45 32	4113
	α Arietis E.	65 10 21	2911	63 38 16	2931	62 6 37	2952	60 35 24	2974
	Aldebaran E.	95 35 43	2737	93 59 52	2753	92 24 22	2769	90 49 13	2784
	Jupiter E.	111 11 59	2690	109 35 6	2706	107 58 34	2722	106 22 23	2737
30	SUN W.	96 27 45	3224	97 53 26	3237	99 18 51	3252	100 43 59	3265
	α Aquilæ W.	54 41 25	3927	55 54 18	3901	57 7 37	3877	58 21 20	3856
	α Arietis E.	53 6 8	3084	51 37 39	3108	50 9 39	3132	48 42 8	3157
	Aldebaran E.	82 58 19	2855	81 25 2	2869	79 52 3	2881	78 19 19	2894
	Jupiter E.	98 26 18	2807	96 51 59	2820	95 17 57	2832	93 44 11	2845



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
17	Aldebaran W.	98 7 49	2398	99 51 26	2380	101 35 29	2363	103 19 57	2345
	Jupiter W.	81 12 34	2362	82 57 4	2344	84 42 0	2326	86 27 22	2309
	Pollux W.	54 2 35	2426	55 45 33	2407	57 28 58	2388	59 12 50	2369
	Spica E.	36 53 12	2492	35 11 47	2483	33 30 9	2475	31 48 21	2470
	Sun E.	69 49 20	2732	68 13 23	2714	66 37 1	2695	65 0 14	2675
18	Jupiter W.	95 20 37	2221	97 8 33	2204	98 56 54	2188	100 45 40	2171
	Pollux W.	67 58 54	2278	69 45 26	2260	71 32 24	2243	73 19 47	2226
	Regulus W.	32 3 33	2278	33 50 5	2258	35 37 6	2240	37 24 34	2222
	Spica E.	23 18 44	2493	21 37 21	2517	19 56 32	2554	18 16 34	2609
	Sun E.	56 49 57	2583	55 10 38	2565	53 30 55	2548	51 50 48	2531
19	Jupiter W.	109 55 32	2095	111 46 39	2081	113 38 8	2066	115 29 59	2053
	Pollux W.	82 22 50	2148	84 12 36	2134	86 2 44	2120	87 53 13	2107
	Regulus W.	46 28 23	2139	48 18 22	2124	50 8 44	2110	51 59 28	2097
	Mars W.	32 37 24	2296	34 23 30	2280	36 9 59	2264	37 56 52	2249
	Sun E.	43 24 28	2452	41 42 7	2437	39 59 25	2424	38 16 25	2411
20	Regulus W.	61 18 7	2037	63 10 44	2026	65 3 37	2017	66 56 45	2009
	Mars W.	46 56 22	2186	48 45 11	2175	50 34 16	2165	52 23 36	2156
	Sun E.	29 37 13	2361	27 52 42	2355	26 8 2	2350	24 23 15	2346
24	Sun W.	27 20 47	2435	29 3 32	2446	30 46 1	2459	32 28 12	2472
	Fomalhaut E.	64 32 52	2340	62 47 51	2362	61 3 22	2386	59 19 27	2411
	α Pegasi E.	81 56 43	2509	80 15 43	2528	78 35 9	2548	76 55 2	2570
25	Sun W.	40 53 54	2553	42 33 54	2571	44 13 29	2588	45 52 40	2607
	Fomalhaut E.	50 49 36	2563	49 9 50	2600	47 30 55	2639	45 52 53	2681
	α Pegasi E.	68 42 29	2699	67 5 48	2729	65 29 46	2761	63 54 27	2795
26	Sun W.	54 2 3	2705	55 38 36	2725	57 14 43	2745	58 50 23	2765
	Fomalhaut E.	37 58 6	2946	36 26 46	3015	34 56 52	3091	33 28 31	3176
	α Pegasi E.	56 9 36	2993	54 39 15	3040	53 9 52	3089	51 41 29	3141
	α Arietis E.	97 25 34	2513	95 44 39	2530	94 4 8	2549	92 24 3	2568
27	Sun W.	66 42 4	2867	68 15 5	2887	69 47 40	2907	71 19 50	2927
	α Pegasi E.	44 36 42	3464	43 15 37	3544	41 56 2	3631	40 38 1	3726
	α Arietis E.	84 10 11	2666	82 32 45	2685	80 55 45	2705	79 19 12	2725
28	Sun W.	78 54 27	3023	80 24 11	3042	81 53 32	3060	83 22 30	3078
	α Pegasi E.	34 35 38	4361	33 29 41	4534	32 26 19	4728	31 25 43	4948
	α Arietis E.	71 23 10	2838	69 49 18	2848	68 15 52	2869	66 42 53	2890
	Aldebaran E.	102 2 47	2670	100 25 27	2687	98 48 30	2704	97 11 55	2721
29	Sun W.	90 42 1	3162	92 8 55	3178	93 35 30	3193	95 1 47	3209
	α Aquilæ W.	49 55 21	4067	51 5 55	4025	52 17 10	3988	53 29 1	3956
	α Arietis E.	59 4 39	2995	57 34 20	3017	56 4 28	3039	54 35 4	3062
	Aldebaran E.	89 14 24	2799	87 39 55	2813	86 5 44	2828	84 31 52	2842
	Jupiter E.	104 46 32	2752	103 11 1	2766	101 35 48	2780	100 0 54	2794
30	Sun W.	102 8 51	3278	103 33 28	3290	104 57 51	3303	106 21 59	3314
	α Aquilæ W.	59 35 24	3838	60 49 47	3822	62 4 27	3807	63 19 22	3794
	α Arietis E.	47 15 7	3182	45 48 36	3209	44 22 37	3237	42 57 11	3266
	Aldebaran E.	76 46 52	2905	75 14 40	2917	73 42 43	2928	72 10 59	2939
	Jupiter E.	92 10 41	2856	90 37 26	2867	89 4 25	2879	87 31 39	2889



Day of the Month.	AIRY'S Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1°59653	1°57951	0°22439	1°43011	42°819	<sup>h</sup> 9 <sup>m</sup> 16 <sup>s</sup> 11°57
2	1°59421	1°58263	0°22504	1°43028	42°667	9 12 15°66
3	1°59183	1°58570	0°22570	1°43046	42°523	9 8 19°75
4	1°58938	1°58869	0°22636	1°43063	42°389	9 4 23°84
5	1°58687	1°59161	0°22703	1°43080	42°265	9 0 27°93
6	1°58431	1°59447	0°22771	1°43098	42°150	8 56 32°02
7	1°58167	1°59727	0°22840	1°43115	42°045	8 52 36°11
8	1°57897	1°60000	0°22909	1°43133	41°949	8 48 40°20
9	1°57622	1°60266	0°22979	1°43150	41°861	8 44 44°29
10	1°57339	1°60527	0°23050	1°43168	41°783	8 40 48°38
11	1°57050	1°60780	0°23121	1°43186	41°714	8 36 52°47
12	1°56754	1°61027	0°23193	1°43203	41°655	8 32 56°56
13	1°56453	1°61268	0°23266	1°43220	41°607	8 29 0°65
14	1°56144	1°61502	0°23339	1°43237	41°568	8 25 4°74
15	1°55829	1°61729	0°23413	1°43253	41°539	8 21 8°83
16	1°55506	1°61951	0°23488	1°43269	41°519	8 17 12°92
17	1°55178	1°62166	0°23563	1°43285	41°511	8 13 17°01
18	1°54843	1°62375	0°23639	1°43300	41°511	8 9 21°10
19	1°54501	1°62577	0°23716	1°43315	41°521	8 5 25°19
20	1°54152	1°62773	0°23793	1°43329	41°542	8 1 29°28
21	1°53796	1°62962	0°23870	1°43343	41°573	7 57 33°37
22	1°53434	1°63146	0°23948	1°43357	41°612	7 53 37°46
23	1°53064	1°63324	0°24027	1°43370	41°660	7 49 41°55
24	1°52688	1°63494	0°24106	1°43382	41°718	7 45 45°64
25	1°52305	1°63658	0°24186	1°43394	41°789	7 41 49°73
26	1°51914	1°63816	0°24266	1°43405	41°870	7 37 53°82
27	1°51515	1°63969	0°24347	1°43415	41°959	7 33 57°91
28	1°51111	1°64115	0°24429	1°43425	42°057	7 30 2°00
29	1°50701	1°64253	0°24511	1°43434	42°166	7 26 6°09
30	1°50284	1°64386	0°24593	1°43442	42°283	7 22 10°17
31	1°49858	1°64513	0°24675	1°43449	42°412	7 18 14°26



Day of the Month.	BESSEL'S Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>h</sup> .783249. Days.	From Mean Noon of January 1.	
	At Mean Midnight,						Day of the Year.	Fraction of the Year.*
	Logarithms of							
	A	B	C	D				
1	+1 <sup>h</sup> .1612	+1 <sup>h</sup> .1131	+9 <sup>h</sup> .6780	+0 <sup>h</sup> .2838	2404368	223	304	.8323
2	1 <sup>h</sup> .1548	1 <sup>h</sup> .1222	9 <sup>h</sup> .6803	0 <sup>h</sup> .2862	2404369	224	305	.8351
3	1 <sup>h</sup> .1483	1 <sup>h</sup> .1310	9 <sup>h</sup> .6826	0 <sup>h</sup> .2886	2404370	225	306	.8378
4	+1 <sup>h</sup> .1414	+1 <sup>h</sup> .1395	+9 <sup>h</sup> .6849	+0 <sup>h</sup> .2910	2404371	226	307	.8405
5	1 <sup>h</sup> .1344	1 <sup>h</sup> .1477	9 <sup>h</sup> .6872	0 <sup>h</sup> .2934	2404372	227	308	.8433
6	1 <sup>h</sup> .1270	1 <sup>h</sup> .1556	9 <sup>h</sup> .6896	0 <sup>h</sup> .2958	2404373	228	309	.8460
7	+1 <sup>h</sup> .1195	+1 <sup>h</sup> .1632	+9 <sup>h</sup> .6920	+0 <sup>h</sup> .2982	2404374	229	310	.8488
8	1 <sup>h</sup> .1116	1 <sup>h</sup> .1706	9 <sup>h</sup> .6944	0 <sup>h</sup> .3006	2404375	230	311	.8515
9	1 <sup>h</sup> .1034	1 <sup>h</sup> .1777	9 <sup>h</sup> .6967	0 <sup>h</sup> .3029	2404376	231	312	.8542
10	+1 <sup>h</sup> .0950	+1 <sup>h</sup> .1846	+9 <sup>h</sup> .6991	+0 <sup>h</sup> .3053	2404377	232	313	.8570
11	1 <sup>h</sup> .0862	1 <sup>h</sup> .1912	9 <sup>h</sup> .7015	0 <sup>h</sup> .3076	2404378	233	314	.8597
12	1 <sup>h</sup> .0772	1 <sup>h</sup> .1977	9 <sup>h</sup> .7040	0 <sup>h</sup> .3099	2404379	234	315	.8624
13	+1 <sup>h</sup> .0677	+1 <sup>h</sup> .2038	+9 <sup>h</sup> .7064	+0 <sup>h</sup> .3121	2404380	235	316	.8652
14	1 <sup>h</sup> .0580	1 <sup>h</sup> .2098	9 <sup>h</sup> .7089	0 <sup>h</sup> .3143	2404381	236	317	.8679
15	1 <sup>h</sup> .0479	1 <sup>h</sup> .2156	9 <sup>h</sup> .7114	0 <sup>h</sup> .3165	2404382	237	318	.8707
16	+1 <sup>h</sup> .0373	+1 <sup>h</sup> .2212	+9 <sup>h</sup> .7138	+0 <sup>h</sup> .3186	2404383	238	319	.8734
17	1 <sup>h</sup> .0264	1 <sup>h</sup> .2265	9 <sup>h</sup> .7163	0 <sup>h</sup> .3206	2404384	239	320	.8761
18	1 <sup>h</sup> .0151	1 <sup>h</sup> .2317	9 <sup>h</sup> .7188	0 <sup>h</sup> .3226	2404385	240	321	.8789
19	+1 <sup>h</sup> .0033	+1 <sup>h</sup> .2367	+9 <sup>h</sup> .7213	+0 <sup>h</sup> .3245	2404386	241	322	.8816
20	0 <sup>h</sup> .9910	1 <sup>h</sup> .2414	9 <sup>h</sup> .7239	0 <sup>h</sup> .3264	2404387	242	323	.8843
21	0 <sup>h</sup> .9782	1 <sup>h</sup> .2460	9 <sup>h</sup> .7264	0 <sup>h</sup> .3282	2404388	243	324	.8871
22	+0 <sup>h</sup> .9649	+1 <sup>h</sup> .2505	+9 <sup>h</sup> .7289	+0 <sup>h</sup> .3299	2404389	244	325	.8898
23	0 <sup>h</sup> .9511	1 <sup>h</sup> .2547	9 <sup>h</sup> .7315	0 <sup>h</sup> .3315	2404390	245	326	.8926
24	0 <sup>h</sup> .9366	1 <sup>h</sup> .2588	9 <sup>h</sup> .7341	0 <sup>h</sup> .3331	2404391	246	327	.8953
25	+0 <sup>h</sup> .9215	+1 <sup>h</sup> .2627	+9 <sup>h</sup> .7366	+0 <sup>h</sup> .3346	2404392	247	328	.8980
26	0 <sup>h</sup> .9057	1 <sup>h</sup> .2664	9 <sup>h</sup> .7392	0 <sup>h</sup> .3359	2404393	248	329	.9008
27	0 <sup>h</sup> .8891	1 <sup>h</sup> .2700	9 <sup>h</sup> .7417	0 <sup>h</sup> .3372	2404394	249	330	.9035
28	+0 <sup>h</sup> .8718	+1 <sup>h</sup> .2734	+9 <sup>h</sup> .7443	+0 <sup>h</sup> .3384	2404395	250	331	.9062
29	0 <sup>h</sup> .8536	1 <sup>h</sup> .2766	9 <sup>h</sup> .7469	0 <sup>h</sup> .3395	2404396	251	332	.9090
30	0 <sup>h</sup> .8344	1 <sup>h</sup> .2797	9 <sup>h</sup> .7495	0 <sup>h</sup> .3405	2404397	252	333	.9117
31	+0 <sup>h</sup> .8142	+1 <sup>h</sup> .2826	+9 <sup>h</sup> .7521	+0 <sup>h</sup> .3414	2404398	253	334	.9145

\* Add .0026 if Fraction be required for the time t, see page 329.

\* Add .0026 if Fraction be required for the time 4, see page 329.



## AT APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Sidereal Time of the Semidiam. passing the Meridian.*	Equation of Time, to be subd. from added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Thur.	1	<sup>h m s</sup> 16 29 45.80	<sup>s</sup> 10.801	<sup>° ' "</sup> S. 21 50 8.1	<sup>"</sup> 23.24	<sup>m s</sup> 1 10.30	<sup>m s</sup> 10 46.18	<sup>s</sup> 0.942
Frid.	2	16 34 5.34	10.827	21 59 13.2	22.18	1 10.38	10 23.26	0.968
Sat.	3	16 38 25.49	10.852	22 7 52.8	21.11	1 10.46	9 59.73	0.993
Sun.	4	16 42 46.22	10.875	22 16 6.7	20.03	1 10.54	9 35.62	1.016
Mon.	5	16 47 7.51	10.899	22 23 54.6	18.95	1 10.62	9 10.95	1.039
Tues.	6	16 51 29.35	10.921	22 31 16.3	17.85	1 10.69	8 45.74	1.061
Wed.	7	16 55 51.71	10.942	22 38 11.6	16.75	1 10.76	8 20.01	1.082
Thur.	8	17 0 14.55	10.961	22 44 40.3	15.64	1 10.83	7 53.80	1.102
Frid.	9	17 4 37.86	10.981	22 50 42.1	14.52	1 10.89	7 27.12	1.121
Sat.	10	17 9 1.63	10.999	22 56 17.0	13.39	1 10.95	6 59.99	1.139
Sun.	11	17 13 25.82	11.016	23 1 24.7	12.25	1 11.00	6 32.44	1.156
Mon.	12	17 17 50.38	11.031	23 6 5.0	11.11	1 11.05	6 4.51	1.171
Tues.	13	17 22 15.29	11.045	23 10 17.8	9.96	1 11.09	5 36.23	1.185
Wed.	14	17 26 40.53	11.058	23 14 3.0	8.80	1 11.13	5 7.61	1.199
Thur.	15	17 31 6.09	11.070	23 17 20.4	7.64	1 11.16	4 38.69	1.211
Frid.	16	17 35 31.93	11.081	23 20 9.9	6.48	1 11.19	4 9.50	1.221
Sat.	17	17 39 58.00	11.090	23 22 31.3	5.31	1 11.22	3 40.07	1.230
Sun.	18	17 44 24.27	11.098	23 24 24.7	4.14	1 11.24	3 10.44	1.238
Mon.	19	17 48 50.72	11.105	23 25 49.9	2.96	1 11.26	2 40.63	1.245
Tues.	20	17 53 17.30	11.110	23 26 46.9	1.78	1 11.27	2 10.69	1.250
Wed.	21	17 57 43.98	11.113	23 27 15.6	0.61	1 11.28	1 40.65	1.253
Thur.	22	18 2 10.72	11.114	23 27 16.0	0.57	1 11.28	1 10.55	1.255
Frid.	23	18 6 37.47	11.114	23 26 48.1	1.75	1 11.28	0 40.43	1.254
Sat.	24	18 11 4.18	11.112	23 25 51.9	2.93	1 11.28	0 10.35	1.252
Sun.	25	18 15 30.83	11.109	23 24 27.3	4.11	1 11.27	0 19.65	1.248
Mon.	26	18 19 57.37	11.103	23 22 34.5	5.29	1 11.26	0 49.55	1.243
Tues.	27	18 24 23.76	11.096	23 20 13.5	6.46	1 11.24	1 19.31	1.236
Wed.	28	18 28 49.97	11.088	23 17 24.2	7.64	1 11.22	1 48.88	1.228
Thur.	29	18 33 15.97	11.078	23 14 6.9	8.81	1 11.19	2 18.24	1.218
Frid.	30	18 37 41.72	11.067	23 10 21.6	9.97	1 11.16	2 47.35	1.207
Sat.	31	18 42 7.19	11.055	23 6 8.5	11.13	1 11.12	3 16.18	1.195
Sun.	32	18 46 32.36	11.042	S. 23 1 27.6	12.29	1 11.08	3 44.70	1.182

\*Mean Time of the Semidiameter passing may be found by subtracting 0<sup>m</sup>.19 from the Sidereal Time.



## AT MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S			Equation of Time, to be added to subt. from Mean Time.	Sidereal Time.
		Apparent Right Ascension.	Apparent Declination.	Semidiam.*		
Thur.	1	<sup>h</sup> 16 <sup>m</sup> 29 <sup>s</sup> 47.74	<sup>°</sup> S. 21 <sup>'</sup> 50 <sup>"</sup> 12.3	<sup>'</sup> 16 <sup>"</sup> 15.8	<sup>m</sup> 10 <sup>s</sup> 46.01	<sup>h</sup> 16 <sup>m</sup> 40 <sup>s</sup> 33.75
Frid.	2	16 34 7.22	21 59 17.0	16 16.0	10 23.09	16 44 30.31
Sat.	3	16 38 27.30	22 7 56.3	16 16.1	9 59.56	16 48 26.86
Sun.	4	16 42 47.96	22 16 9.9	16 16.3	9 35.46	16 52 23.42
Mon.	5	16 47 9.18	22 23 57.5	16 16.4	9 10.79	16 56 19.97
Tues.	6	16 51 30.95	22 31 18.9	16 16.5	8 45.58	17 0 16.53
Wed.	7	16 55 53.23	22 38 13.9	16 16.7	8 19.86	17 4 13.09
Thur.	8	17 0 15.99	22 44 42.3	16 16.8	7 53.66	17 8 9.65
Frid.	9	17 4 39.22	22 50 43.9	16 16.9	7 26.98	17 12 6.20
Sat.	10	17 9 2.91	22 56 18.6	16 17.0	6 59.85	17 16 2.76
Sun.	11	17 13 27.01	23 1 26.0	16 17.1	6 32.31	17 19 59.32
Mon.	12	17 17 51.49	23 6 6.1	16 17.2	6 4.39	17 23 55.88
Tues.	13	17 22 16.32	23 10 18.7	16 17.3	5 36.12	17 27 52.44
Wed.	14	17 26 41.48	23 14 3.7	16 17.4	5 7.52	17 31 49.00
Thur.	15	17 31 6.95	23 17 21.0	16 17.5	4 38.60	17 35 45.55
Frid.	16	17 35 32.70	23 20 10.3	16 17.5	4 9.41	17 39 42.11
Sat.	17	17 39 58.68	23 22 31.6	16 17.6	3 39.99	17 43 38.67
Sun.	18	17 44 24.86	23 24 24.9	16 17.7	3 10.37	17 47 35.23
Mon.	19	17 48 51.21	23 25 50.1	16 17.7	2 40.57	17 51 31.78
Tues.	20	17 53 17.70	23 26 47.0	16 17.8	2 10.64	17 55 28.34
Wed.	21	17 57 44.29	23 27 15.6	16 17.9	1 40.61	17 59 24.90
Thur.	22	18 2 10.94	23 27 16.0	16 17.9	1 10.52	18 3 21.46
Frid.	23	18 6 37.60	23 26 48.1	16 18.0	0 40.42	18 7 18.62
Sat.	24	18 11 4.22	23 25 51.9	16 18.0	0 10.36	18 11 14.58
Sun.	25	18 15 30.77	23 24 27.4	16 18.0	0 19.64	18 15 11.13
Mon.	26	18 19 57.22	23 22 34.6	16 18.1	0 49.53	18 19 7.69
Tues.	27	18 24 23.52	23 20 13.6	16 18.1	1 19.28	18 23 4.24
Wed.	28	18 28 49.64	23 17 24.5	16 18.1	1 48.84	18 27 0.80
Thur.	29	18 33 15.55	23 14 7.3	16 18.2	2 18.19	18 30 57.36
Frid.	30	18 37 41.21	23 10 22.1	16 18.2	2 47.29	18 34 53.92
Sat.	31	18 42 6.59	23 6 9.1	16 18.2	3 16.11	18 38 50.48
Sun.	32	18 46 31.67	S. 23 1 28.4	16 18.2	3 44.63	18 42 47.04

\* The Semidiameter for *Apparent* Noon may be assumed the same as that for *Mean* Noon.



## MEAN TIME.

Day of the Month.	THE SUN'S <i>Apparent</i>		Logarithm of the Radius Vector of the Earth.	THE MOON'S			
	Longitude.	Latitude.		Semidiameter.		Horizontal Parallax.	
	Noon.	Noon.		Noon.	Midnight.	Noon.	Midnight.
1	249 8 45.3	S. 0.41	9.9937248	15 1.5	14 57.3	55 3.0	54 47.5
2	250 9 37.1	0.43	9.9936566	14 53.7	14 50.7	54 34.3	54 23.3
3	251 10 29.8	0.42	9.9935906	14 48.3	14 46.4	54 14.4	54 7.7
4	252 11 23.4	0.39	9.9935270	14 45.1	14 44.3	54 2.9	53 59.9
5	253 12 17.8	0.33	9.9934658	14 44.0	14 44.1	53 58.7	53 59.1
6	254 13 13.1	0.26	9.9934070	14 44.6	14 45.5	54 0.9	54 4.1
7	255 14 9.4	0.16	9.9933508	14 46.7	14 48.2	54 8.6	54 14.2
8	256 15 6.5	S. 0.05	9.9932972	14 50.1	14 52.2	54 21.0	54 28.9
9	257 16 4.6	N. 0.06	9.9932461	14 54.7	14 57.4	54 37.8	54 47.8
10	258 17 3.6	0.18	9.9931977	15 0.4	15 3.7	54 58.8	55 10.9
11	259 18 3.5	0.30	9.9931519	15 7.3	15 11.2	55 24.1	55 38.4
12	260 19 4.4	0.41	9.9931085	15 15.4	15 20.0	55 53.9	56 10.5
13	261 20 6.1	0.51	9.9930677	15 24.8	15 30.0	56 28.3	56 47.3
14	262 21 8.7	0.59	9.9930293	15 35.5	15 41.2	57 7.3	57 28.2
15	263 22 12.3	0.66	9.9929933	15 47.1	15 53.2	57 50.0	58 12.4
16	264 23 16.9	0.69	9.9929595	15 59.4	16 5.6	58 35.0	58 57.6
17	265 24 22.4	0.69	9.9929277	16 11.6	16 17.3	59 19.6	59 40.6
18	266 25 28.8	0.66	9.9928979	16 22.6	16 27.4	60 0.1	60 17.5
19	267 26 36.0	0.60	9.9928698	16 31.4	16 34.5	60 32.1	60 43.5
20	268 27 44.0	0.50	9.9928434	16 36.6	16 37.5	60 51.2	60 54.7
21	269 28 52.6	0.37	9.9928187	16 37.3	16 35.9	60 53.9	60 48.6
22	270 30 1.8	0.24	9.9927955	16 33.2	16 29.4	60 38.9	60 25.0
23	271 31 11.4	N. 0.09	9.9927738	16 24.6	16 18.9	60 7.3	59 46.3
24	272 32 21.2	S. 0.04	9.9927537	16 12.4	16 5.3	59 22.6	58 56.7
25	273 33 31.0	0.16	9.9927352	15 57.9	15 50.3	58 29.5	58 1.5
26	274 34 40.9	0.26	9.9927185	15 42.6	15 35.1	57 33.5	57 5.9
27	275 35 50.8	0.34	9.9927037	15 27.8	15 20.9	56 39.2	56 13.9
28	276 37 0.6	0.39	9.9926908	15 14.5	15 8.6	55 50.4	55 29.0
29	277 38 10.2	0.41	9.9926801	15 3.4	14 58.8	55 9.9	54 53.1
30	278 39 19.7	0.41	9.9926717	14 54.9	14 51.7	54 38.8	54 27.1
31	279 40 28.9	0.39	9.9926656	14 49.2	14 47.4	54 17.9	54 11.2
32	280 41 38.1	S. 0.34	9.9926619	14 46.3	14 45.7	54 7.0	54 5.1



## MEAN TIME.

## THE MOON'S

Day of the Week.	Day of the Month.	Longitude.		Latitude.		Age.	Meridian
		Noon.	Midnight.	Noon.	Midnight.	Noon.	Passage.
Thur.	1	356° 58' 59".2	3° 4' 44".5	S. 5° 4' 7".6	S. 5° 10' 7".5	8.4	h m 7 29.3
Frid.	2	9° 7' 41".1	15° 8' 18".2	5 12 36.9	5 11 38.5	9.4	8 10.9
Sat.	3	21° 7' 3".5	27° 4' 22".7	5 7 16.3	4 59 35.3	10.4	8 52.1
Sun.	4	33° 0' 39".6	38° 56' 16".0	4 48 41.7	4 34 42.8	11.4	9 33.6
Mon.	5	44° 51' 31".3	50° 46' 43".8	4 17 47.4	3 58 4.9	12.4	10 16.3
Tues.	6	56° 42' 9".8	62° 38' 4.6	3 35 47.0	3 11 6.0	13.4	11 0.8
Wed.	7	68° 34' 41".8	74° 32' 14".9	2 44 16.0	2 15 32.6	14.4	11 47.4
Thur.	8	80° 30' 56".9	86° 31' 0.6	1 45 12.4	1 13 33.6	15.4	12 36.0
Frid.	9	92° 32' 39".0	98° 36' 5.8	S. 0° 40' 55.4	S. 0° 7' 37.9	16.4	13 26.3
Sat.	10	104° 41' 35".5	110° 49' 23".6	N. 0° 25' 57.5	N. 0° 59' 28.9	17.4	14 17.4
Sun.	11	116° 59' 46".6	123° 13' 2.2	1 32 33.9	2 4 49.3	18.4	15 8.6
Mon.	12	129° 29' 29".5	135° 49' 28.5	2 35 51.7	3 5 17.7	19.4	15 59.2
Tues.	13	142° 13' 19".5	148° 41' 23".0	3 32 43.3	3 57 44.8	20.4	16 48.8
Wed.	14	155° 13' 59".5	161° 51' 27".6	4 19 58.9	4 39 2.5	21.4	17 37.5
Thur.	15	168° 34' 4.3	175° 22' 2.8	4 54 33.2	5 6 10.1	22.4	18 26.0
Frid.	16	182° 15' 32".6	189° 14' 37".1	5 13 33.7	5 16 27.2	23.4	19 15.0
Sat.	17	196° 19' 13".3	203° 29' 10".4	5 14 36.8	5 7 53.2	24.4	20 5.6
Sun.	18	210° 44' 9".1	218° 3' 40".3	4 56 12.1	4 39 35.2	25.4	20 58.9
Mon.	19	225° 27' 6".9	232° 53' 41".9	4 18 11.5	3 52 17.6	26.4	21 55.4
Tues.	20	240° 22' 31".2	247° 52' 34".4	3 22 17.2	2 48 42.2	27.4	22 55.5
Wed.	21	255° 22' 47".5	262° 52' 4.2	2 12 10.5	1 33 25.4	28.4	23 58.0
Thur.	22	270° 19' 19".2	277° 43' 31".0	N. 0° 53' 13.6	N. 0° 12' 23.1	0.0	0
Frid.	23	285° 3' 43".0	292° 19' 6".7	S. 0° 28' 18.6	S. 1° 8' 6.7	1.0	1 0.8
Sat.	24	299° 29' 1.5	306° 32' 56".6	1 46 20.0	2 22 23.2	2.0	2 1.8
Sun.	25	313° 30' 31".1	320° 21' 33".7	2 55 46.2	3 26 5.1	3.0	2 58.9
Mon.	26	327° 6' 2.3	333° 44' 2.4	3 53 1.8	4 16 23.3	4.0	3 51.5
Tues.	27	340° 15' 47".1	346° 41' 36".2	4 36 1.6	4 51 52.2	5.0	4 40.0
Wed.	28	353° 1' 53".8	359° 17' 8".2	5 3 54.4	5 12 9.3	6.0	5 25.1
Thur.	29	5° 27' 50".3	11° 34' 33".4	5 16 40.3	5 17 32.7	7.0	6 8.0
Frid.	30	17° 37' 51".9	23° 38' 20".7	5 14 52.0	5 8 45.4	8.0	6 49.6
Sat.	31	29° 36' 34".4	35° 33' 7".4	4 59 20.2	4 46 44.9	9.0	7 31.0
Sun.	32	41° 28' 32".9	47° 23' 22".7	S. 4° 31' 8.1	S. 4° 12' 39.5	10.0	8 13.2



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 1.</b>				<b>SATURDAY 3.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	23 57 1 <sup>32</sup>	S. 5 50 58 <sup>6</sup>	115 <sup>89</sup>	0	1 25 43 <sup>78</sup>	N. 3 29 38 <sup>9</sup>	115 <sup>20</sup>
1	23 58 54 <sup>67</sup>	5 39 22 <sup>8</sup>	116 <sup>04</sup>	1	1 27 33 <sup>56</sup>	3 41 9 <sup>6</sup>	115 <sup>03</sup>
2	0 0 47 <sup>85</sup>	5 27 46 <sup>1</sup>	116 <sup>18</sup>	2	1 29 23 <sup>35</sup>	3 52 39 <sup>2</sup>	114 <sup>85</sup>
3	0 2 40 <sup>87</sup>	5 16 8 <sup>6</sup>	116 <sup>31</sup>	3	1 31 13 <sup>16</sup>	4 4 7 <sup>8</sup>	114 <sup>67</sup>
4	0 4 33 <sup>74</sup>	5 4 30 <sup>4</sup>	116 <sup>43</sup>	4	1 33 2 <sup>09</sup>	4 15 35 <sup>3</sup>	114 <sup>48</sup>
5	0 6 26 <sup>46</sup>	4 52 51 <sup>5</sup>	116 <sup>54</sup>	5	1 34 52 <sup>84</sup>	4 27 1 <sup>6</sup>	114 <sup>28</sup>
6	0 8 19 <sup>03</sup>	4 41 11 <sup>9</sup>	116 <sup>65</sup>	6	1 36 42 <sup>73</sup>	4 38 26 <sup>7</sup>	114 <sup>08</sup>
7	0 10 11 <sup>45</sup>	4 29 31 <sup>7</sup>	116 <sup>75</sup>	7	1 38 32 <sup>64</sup>	4 49 50 <sup>6</sup>	113 <sup>88</sup>
8	0 12 3 <sup>73</sup>	4 17 50 <sup>9</sup>	116 <sup>84</sup>	8	1 40 22 <sup>59</sup>	5 1 13 <sup>3</sup>	113 <sup>67</sup>
9	0 13 55 <sup>88</sup>	4 6 9 <sup>6</sup>	116 <sup>93</sup>	9	1 42 12 <sup>51</sup>	5 12 34 <sup>6</sup>	113 <sup>44</sup>
10	0 15 47 <sup>90</sup>	3 54 27 <sup>8</sup>	117 <sup>01</sup>	10	1 44 2 <sup>61</sup>	5 23 54 <sup>6</sup>	113 <sup>22</sup>
11	0 17 39 <sup>78</sup>	3 42 45 <sup>5</sup>	117 <sup>08</sup>	11	1 45 52 <sup>68</sup>	5 35 13 <sup>2</sup>	113 <sup>98</sup>
12	0 19 31 <sup>54</sup>	3 31 2 <sup>8</sup>	117 <sup>15</sup>	12	1 47 42 <sup>80</sup>	5 46 30 <sup>3</sup>	113 <sup>73</sup>
13	0 21 23 <sup>18</sup>	3 19 19 <sup>7</sup>	117 <sup>20</sup>	13	1 49 32 <sup>97</sup>	5 57 46 <sup>0</sup>	113 <sup>50</sup>
14	0 23 14 <sup>70</sup>	3 7 36 <sup>4</sup>	117 <sup>25</sup>	14	1 51 23 <sup>19</sup>	6 9 0 <sup>3</sup>	113 <sup>25</sup>
15	0 25 6 <sup>11</sup>	2 55 52 <sup>7</sup>	117 <sup>30</sup>	15	1 53 13 <sup>48</sup>	6 20 13 <sup>0</sup>	113 <sup>98</sup>
16	0 26 57 <sup>41</sup>	2 44 8 <sup>7</sup>	117 <sup>34</sup>	16	1 55 3 <sup>82</sup>	6 31 24 <sup>1</sup>	113 <sup>74</sup>
17	0 28 48 <sup>61</sup>	2 32 24 <sup>6</sup>	117 <sup>37</sup>	17	1 56 54 <sup>22</sup>	6 42 33 <sup>7</sup>	113 <sup>46</sup>
18	0 30 39 <sup>70</sup>	2 20 40 <sup>3</sup>	117 <sup>40</sup>	18	1 58 44 <sup>69</sup>	6 53 41 <sup>6</sup>	113 <sup>18</sup>
19	0 32 30 <sup>70</sup>	2 8 55 <sup>8</sup>	117 <sup>42</sup>	19	2 0 35 <sup>23</sup>	7 4 47 <sup>8</sup>	112 <sup>89</sup>
20	0 34 21 <sup>60</sup>	1 57 11 <sup>2</sup>	117 <sup>43</sup>	20	2 2 25 <sup>84</sup>	7 15 52 <sup>3</sup>	112 <sup>61</sup>
21	0 36 12 <sup>41</sup>	1 45 26 <sup>6</sup>	117 <sup>43</sup>	21	2 4 16 <sup>53</sup>	7 26 55 <sup>1</sup>	112 <sup>32</sup>
22	0 38 3 <sup>13</sup>	1 33 42 <sup>0</sup>	117 <sup>43</sup>	22	2 6 7 <sup>29</sup>	7 37 56 <sup>1</sup>	112 <sup>01</sup>
23	0 39 53 <sup>77</sup>	S. 1 21 57 <sup>4</sup>	117 <sup>43</sup>	23	2 7 58 <sup>14</sup>	N. 7 48 55 <sup>2</sup>	109 <sup>70</sup>
<b>FRIDAY 2.</b>				<b>SUNDAY 4.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	0 41 44 <sup>34</sup>	S. 1 10 12 <sup>8</sup>	117 <sup>42</sup>	0	2 9 49 <sup>07</sup>	N. 7 59 52 <sup>5</sup>	109 <sup>39</sup>
1	0 43 34 <sup>83</sup>	0 58 28 <sup>4</sup>	117 <sup>39</sup>	1	2 11 40 <sup>09</sup>	8 10 47 <sup>9</sup>	109 <sup>07</sup>
2	0 45 25 <sup>25</sup>	0 46 44 <sup>1</sup>	117 <sup>37</sup>	2	2 13 31 <sup>19</sup>	8 21 41 <sup>3</sup>	108 <sup>73</sup>
3	0 47 15 <sup>60</sup>	0 34 59 <sup>9</sup>	117 <sup>34</sup>	3	2 15 22 <sup>39</sup>	8 32 32 <sup>7</sup>	108 <sup>40</sup>
4	0 49 5 <sup>89</sup>	0 23 16 <sup>0</sup>	117 <sup>30</sup>	4	2 17 13 <sup>69</sup>	8 43 22 <sup>1</sup>	108 <sup>06</sup>
5	0 50 56 <sup>11</sup>	S. 0 11 32 <sup>3</sup>	117 <sup>26</sup>	5	2 19 5 <sup>08</sup>	8 54 9 <sup>4</sup>	107 <sup>71</sup>
6	0 52 46 <sup>28</sup>	N. 0 0 11 <sup>1</sup>	117 <sup>20</sup>	6	2 20 56 <sup>58</sup>	9 4 54 <sup>6</sup>	107 <sup>36</sup>
7	0 54 36 <sup>40</sup>	0 11 54 <sup>1</sup>	117 <sup>14</sup>	7	2 22 48 <sup>18</sup>	9 15 37 <sup>7</sup>	107 <sup>00</sup>
8	0 56 26 <sup>47</sup>	0 23 36 <sup>8</sup>	117 <sup>08</sup>	8	2 24 39 <sup>88</sup>	9 26 18 <sup>6</sup>	106 <sup>63</sup>
9	0 58 16 <sup>49</sup>	0 35 19 <sup>1</sup>	117 <sup>01</sup>	9	2 26 31 <sup>70</sup>	9 36 57 <sup>2</sup>	106 <sup>26</sup>
10	1 0 6 <sup>47</sup>	0 47 0 <sup>9</sup>	116 <sup>93</sup>	10	2 28 23 <sup>63</sup>	9 47 33 <sup>6</sup>	105 <sup>88</sup>
11	1 1 56 <sup>41</sup>	0 58 42 <sup>2</sup>	116 <sup>84</sup>	11	2 30 15 <sup>67</sup>	9 58 7 <sup>7</sup>	105 <sup>48</sup>
12	1 3 46 <sup>31</sup>	1 10 23 <sup>0</sup>	116 <sup>76</sup>	12	2 32 7 <sup>83</sup>	10 8 39 <sup>4</sup>	105 <sup>08</sup>
13	1 5 36 <sup>18</sup>	1 22 3 <sup>3</sup>	116 <sup>66</sup>	13	2 34 0 <sup>11</sup>	10 19 8 <sup>7</sup>	104 <sup>68</sup>
14	1 7 26 <sup>03</sup>	1 33 42 <sup>9</sup>	116 <sup>56</sup>	14	2 35 52 <sup>51</sup>	10 29 35 <sup>6</sup>	104 <sup>28</sup>
15	1 9 15 <sup>86</sup>	1 45 22 <sup>0</sup>	116 <sup>46</sup>	15	2 37 45 <sup>04</sup>	10 40 0 <sup>1</sup>	103 <sup>87</sup>
16	1 11 5 <sup>66</sup>	1 57 0 <sup>4</sup>	116 <sup>34</sup>	16	2 39 37 <sup>70</sup>	10 50 22 <sup>0</sup>	103 <sup>44</sup>
17	1 12 55 <sup>44</sup>	2 8 38 <sup>1</sup>	116 <sup>22</sup>	17	2 41 30 <sup>49</sup>	11 0 41 <sup>4</sup>	103 <sup>02</sup>
18	1 14 45 <sup>22</sup>	2 20 15 <sup>0</sup>	116 <sup>08</sup>	18	2 43 23 <sup>41</sup>	11 10 58 <sup>2</sup>	102 <sup>58</sup>
19	1 16 34 <sup>98</sup>	2 31 51 <sup>1</sup>	115 <sup>95</sup>	19	2 45 16 <sup>46</sup>	11 21 12 <sup>4</sup>	102 <sup>14</sup>
20	1 18 24 <sup>74</sup>	2 43 26 <sup>4</sup>	115 <sup>81</sup>	20	2 47 9 <sup>66</sup>	11 31 23 <sup>9</sup>	101 <sup>69</sup>
21	1 20 14 <sup>49</sup>	2 55 0 <sup>9</sup>	115 <sup>67</sup>	21	2 49 2 <sup>99</sup>	11 41 32 <sup>7</sup>	101 <sup>24</sup>
22	1 22 4 <sup>25</sup>	3 6 34 <sup>5</sup>	115 <sup>52</sup>	22	2 50 56 <sup>46</sup>	11 51 38 <sup>8</sup>	100 <sup>78</sup>
23	1 23 54 <sup>01</sup>	3 18 7 <sup>2</sup>	115 <sup>37</sup>	23	2 52 50 <sup>08</sup>	12 1 42 <sup>1</sup>	100 <sup>31</sup>
24	1 25 43 <sup>78</sup>	N. 3 29 38 <sup>9</sup>	115 <sup>20</sup>	24	2 54 43 <sup>85</sup>	N. 12 11 42 <sup>5</sup>	99 <sup>83</sup>



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>MONDAY 5.</b>				<b>WEDNESDAY 7.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	2 54 43.85	N.12 11 42.5	99.83	0	4 29 11.55	N.19 2 38.9	68.62
1	2 56 37.77	12 21 40.1	99.35	1	4 31 14.41	19 9 28.1	67.79
2	2 58 31.83	12 31 34.7	98.86	2	4 33 17.48	19 16 12.4	66.96
3	3 0 26.05	12 41 26.4	98.37	3	4 35 20.75	19 22 51.6	66.11
4	3 2 20.43	12 51 15.1	97.87	4	4 37 24.22	19 29 25.7	65.27
5	3 4 14.96	13 1 0.8	97.36	5	4 39 27.89	19 35 54.8	64.42
6	3 6 9.65	13 10 43.4	96.84	6	4 41 31.77	19 42 18.7	63.55
7	3 8 4.51	13 20 22.9	96.32	7	4 43 35.84	19 48 37.4	62.68
8	3 9 59.53	13 29 59.2	95.78	8	4 45 40.12	19 54 50.8	61.80
9	3 11 54.71	13 39 32.3	95.24	9	4 47 44.60	20 0 59.0	60.92
10	3 13 50.06	13 49 2.1	94.70	10	4 49 49.28	20 7 1.9	60.03
11	3 15 45.58	13 58 28.7	94.15	11	4 51 54.16	20 12 59.4	59.13
12	3 17 41.26	14 7 51.9	93.58	12	4 53 59.23	20 18 51.4	58.22
13	3 19 37.12	14 17 11.7	93.02	13	4 56 4.50	20 24 38.0	57.32
14	3 21 33.16	14 26 28.1	92.44	14	4 58 9.97	20 30 19.2	56.41
15	3 23 29.38	14 35 41.0	91.86	15	5 0 15.64	20 35 54.9	55.48
16	3 25 25.77	14 44 50.4	91.27	16	5 2 21.50	20 41 25.0	54.55
17	3 27 22.34	14 53 56.2	90.68	17	5 4 27.55	20 46 49.5	53.62
18	3 29 19.10	15 2 58.5	90.08	18	5 6 33.79	20 52 8.4	52.67
19	3 31 16.03	15 11 57.1	89.46	19	5 8 40.23	20 57 21.6	51.72
20	3 33 13.15	15 20 52.0	88.84	20	5 10 46.85	21 2 29.1	50.77
21	3 35 10.46	15 29 43.2	88.22	21	5 12 53.66	21 7 30.8	49.80
22	3 37 7.95	15 38 30.7	87.60	22	5 15 0.66	21 12 26.7	48.83
23	3 39 5.63	N.15 47 14.4	86.96	23	5 17 7.85	N.21 17 16.8	47.87
<b>TUESDAY 6.</b>				<b>THURSDAY 8.</b>			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	3 41 3.50	N.15 55 54.2	86.31	0	5 19 15.22	N.21 24 1.1	46.89
1	3 43 1.56	16 4 30.1	85.65	1	5 21 22.77	21 26 39.5	45.90
2	3 44 59.81	16 13 2.0	84.99	2	5 23 30.51	21 31 11.9	44.91
3	3 46 58.26	16 21 30.0	84.32	3	5 25 38.42	21 35 38.4	43.91
4	3 48 56.90	16 29 53.9	83.64	4	5 27 46.51	21 39 58.8	42.90
5	3 50 55.73	16 38 13.7	82.96	5	5 29 54.77	21 44 13.2	41.89
6	3 52 54.76	16 46 29.4	82.27	6	5 32 3.20	21 48 21.5	40.88
7	3 54 53.99	16 54 41.0	81.58	7	5 34 11.81	21 52 23.7	39.86
8	3 56 53.41	17 2 48.4	80.88	8	5 36 20.59	21 56 19.8	38.83
9	3 58 53.03	17 10 51.5	80.17	9	5 38 29.53	22 0 9.7	37.80
10	4 0 52.85	17 18 50.4	79.45	10	5 40 38.64	22 3 53.4	36.77
11	4 2 52.87	17 26 44.9	78.72	11	5 42 47.91	22 7 30.9	35.72
12	4 4 53.10	17 34 35.0	77.98	12	5 44 57.33	22 11 2.0	34.67
13	4 6 53.52	17 42 20.7	77.24	13	5 47 6.92	22 14 26.9	33.62
14	4 8 54.15	17 50 1.9	76.49	14	5 49 16.66	22 17 45.4	32.56
15	4 10 54.97	17 57 38.6	75.74	15	5 51 26.56	22 20 57.6	31.50
16	4 12 56.00	18 5 10.8	74.98	16	5 53 36.61	22 24 3.4	30.43
17	4 14 57.23	18 12 38.4	74.21	17	5 55 46.80	22 27 2.8	29.36
18	4 16 58.66	18 20 1.3	73.43	18	5 57 57.14	22 29 55.7	28.28
19	4 19 0.30	18 27 19.5	72.64	19	6 0 7.63	22 32 42.2	27.20
20	4 21 2.14	18 34 33.0	71.86	20	6 2 18.25	22 35 22.1	26.11
21	4 23 4.19	18 41 41.8	71.06	21	6 4 29.01	22 37 55.5	25.02
22	4 25 6.44	18 48 45.7	70.24	22	6 6 39.91	22 40 22.4	23.93
23	4 27 8.89	18 55 44.7	69.43	23	6 8 50.94	22 42 42.7	22.83
24	4 29 11.55	N.19 2 38.9	68.62	24	6 11 2.10	N.22 44 56.3	21.72



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10".
<b>FRIDAY 9.</b>				<b>SUNDAY 11.</b>			
0	6 <sup>h</sup> 11 <sup>m</sup> 2 <sup>s</sup> 10	N. 22 44 56 <sup>°</sup> 3	21 <sup>''</sup> 72	0	7 <sup>h</sup> 57 <sup>m</sup> 28 <sup>s</sup> 06	N. 22 17 10 <sup>°</sup> 2	33 <sup>''</sup> 72
1	6 13 13 <sup>s</sup> 39	22 47 3 <sup>°</sup> 3	20 <sup>''</sup> 62	1	7 59 41 <sup>s</sup> 65	22 13 44 <sup>°</sup> 4	34 <sup>''</sup> 88
2	6 15 24 <sup>s</sup> 80	22 49 3 <sup>°</sup> 7	19 <sup>''</sup> 52	2	8 1 55 <sup>s</sup> 21	22 10 11 <sup>°</sup> 7	36 <sup>''</sup> 03
3	6 17 36 <sup>s</sup> 33	22 50 57 <sup>°</sup> 5	18 <sup>''</sup> 40	3	8 4 8 <sup>s</sup> 74	22 6 32 <sup>°</sup> 1	37 <sup>''</sup> 18
4	6 19 47 <sup>s</sup> 97	22 52 44 <sup>°</sup> 5	17 <sup>''</sup> 28	4	8 6 22 <sup>s</sup> 23	22 2 45 <sup>°</sup> 5	38 <sup>''</sup> 33
5	6 21 59 <sup>s</sup> 73	22 54 24 <sup>°</sup> 8	16 <sup>''</sup> 15	5	8 8 35 <sup>s</sup> 69	21 58 52 <sup>°</sup> 1	39 <sup>''</sup> 48
6	6 24 11 <sup>s</sup> 61	22 55 58 <sup>°</sup> 3	15 <sup>''</sup> 03	6	8 10 49 <sup>s</sup> 10	21 54 51 <sup>°</sup> 7	40 <sup>''</sup> 63
7	6 26 23 <sup>s</sup> 59	22 57 25 <sup>°</sup> 1	13 <sup>''</sup> 90	7	8 13 2 <sup>s</sup> 47	21 50 44 <sup>°</sup> 5	41 <sup>''</sup> 77
8	6 28 35 <sup>s</sup> 68	22 58 45 <sup>°</sup> 1	12 <sup>''</sup> 77	8	8 15 15 <sup>s</sup> 80	21 46 30 <sup>°</sup> 5	42 <sup>''</sup> 91
9	6 30 47 <sup>s</sup> 87	22 59 58 <sup>°</sup> 3	11 <sup>''</sup> 63	9	8 17 29 <sup>s</sup> 08	21 42 9 <sup>°</sup> 6	44 <sup>''</sup> 05
10	6 33 0 <sup>s</sup> 16	23 1 4 <sup>°</sup> 7	10 <sup>''</sup> 50	10	8 19 42 <sup>s</sup> 31	21 37 41 <sup>°</sup> 9	45 <sup>''</sup> 18
11	6 35 12 <sup>s</sup> 55	23 2 4 <sup>°</sup> 3	9 <sup>''</sup> 35	11	8 21 55 <sup>s</sup> 48	21 33 7 <sup>°</sup> 4	46 <sup>''</sup> 31
12	6 37 25 <sup>s</sup> 02	23 2 56 <sup>°</sup> 9	8 <sup>''</sup> 20	12	8 24 8 <sup>s</sup> 60	21 28 26 <sup>°</sup> 2	47 <sup>''</sup> 44
13	6 39 37 <sup>s</sup> 59	23 3 42 <sup>°</sup> 7	7 <sup>''</sup> 07	13	8 26 21 <sup>s</sup> 66	21 23 38 <sup>°</sup> 1	48 <sup>''</sup> 57
14	6 41 50 <sup>s</sup> 24	23 4 21 <sup>°</sup> 7	5 <sup>''</sup> 92	14	8 28 34 <sup>s</sup> 67	21 18 43 <sup>°</sup> 3	49 <sup>''</sup> 69
15	6 44 2 <sup>s</sup> 98	23 4 53 <sup>°</sup> 7	4 <sup>''</sup> 76	15	8 30 47 <sup>s</sup> 61	21 13 41 <sup>°</sup> 8	50 <sup>''</sup> 81
16	6 46 15 <sup>s</sup> 80	23 5 18 <sup>°</sup> 8	3 <sup>''</sup> 61	16	8 33 0 <sup>s</sup> 49	21 8 33 <sup>°</sup> 6	51 <sup>''</sup> 92
17	6 48 28 <sup>s</sup> 69	23 5 37 <sup>°</sup> 0	2 <sup>''</sup> 46	17	8 35 13 <sup>s</sup> 30	21 3 18 <sup>°</sup> 7	53 <sup>''</sup> 03
18	6 50 41 <sup>s</sup> 66	23 5 48 <sup>°</sup> 3	1 <sup>''</sup> 30	18	8 37 26 <sup>s</sup> 04	20 57 57 <sup>°</sup> 2	54 <sup>''</sup> 14
19	6 52 54 <sup>s</sup> 69	23 5 52 <sup>°</sup> 6	0 <sup>''</sup> 14	19	8 39 38 <sup>s</sup> 72	20 52 29 <sup>°</sup> 0	55 <sup>''</sup> 25
20	6 55 7 <sup>s</sup> 79	23 5 50 <sup>°</sup> 0	1 <sup>''</sup> 02	20	8 41 51 <sup>s</sup> 32	20 46 54 <sup>°</sup> 2	56 <sup>''</sup> 35
21	6 57 20 <sup>s</sup> 96	23 5 40 <sup>°</sup> 4	2 <sup>''</sup> 18	21	8 44 3 <sup>s</sup> 85	20 41 12 <sup>°</sup> 8	57 <sup>''</sup> 44
22	6 59 34 <sup>s</sup> 19	23 5 23 <sup>°</sup> 8	3 <sup>''</sup> 34	22	8 46 16 <sup>s</sup> 31	20 35 24 <sup>°</sup> 9	58 <sup>''</sup> 53
23	7 1 47 <sup>s</sup> 47	N. 23 5 0 <sup>°</sup> 3	4 <sup>''</sup> 51	23	8 48 28 <sup>s</sup> 69	N. 20 29 30 <sup>°</sup> 4	59 <sup>''</sup> 62
<b>SATURDAY 10.</b>				<b>MONDAY 12.</b>			
0	7 4 0 <sup>s</sup> 80	N. 23 4 29 <sup>°</sup> 7	5 <sup>''</sup> 68	0	8 50 40 <sup>s</sup> 99	N. 20 23 29 <sup>°</sup> 4	60 <sup>''</sup> 71
1	7 6 14 <sup>s</sup> 18	23 3 52 <sup>°</sup> 1	6 <sup>''</sup> 85	1	8 52 53 <sup>s</sup> 21	20 17 21 <sup>°</sup> 9	61 <sup>''</sup> 78
2	7 8 27 <sup>s</sup> 61	23 3 7 <sup>°</sup> 5	8 <sup>''</sup> 02	2	8 55 5 <sup>s</sup> 35	20 11 8 <sup>°</sup> 0	62 <sup>''</sup> 85
3	7 10 41 <sup>s</sup> 09	23 2 15 <sup>°</sup> 9	9 <sup>''</sup> 18	3	8 57 17 <sup>s</sup> 41	20 4 47 <sup>°</sup> 7	63 <sup>''</sup> 92
4	7 12 54 <sup>s</sup> 60	23 1 17 <sup>°</sup> 3	10 <sup>''</sup> 35	4	8 59 29 <sup>s</sup> 39	19 58 20 <sup>°</sup> 9	64 <sup>''</sup> 99
5	7 15 8 <sup>s</sup> 15	23 0 11 <sup>°</sup> 7	11 <sup>''</sup> 53	5	9 1 41 <sup>s</sup> 28	19 51 47 <sup>°</sup> 8	66 <sup>''</sup> 04
6	7 17 21 <sup>s</sup> 73	22 58 59 <sup>°</sup> 0	12 <sup>''</sup> 70	6	9 3 53 <sup>s</sup> 08	19 45 8 <sup>°</sup> 4	67 <sup>''</sup> 10
7	7 19 35 <sup>s</sup> 34	22 57 39 <sup>°</sup> 3	13 <sup>''</sup> 87	7	9 6 4 <sup>s</sup> 80	19 38 22 <sup>°</sup> 6	68 <sup>''</sup> 16
8	7 21 48 <sup>s</sup> 97	22 56 12 <sup>°</sup> 6	15 <sup>''</sup> 04	8	9 8 16 <sup>s</sup> 43	19 31 30 <sup>°</sup> 5	69 <sup>''</sup> 20
9	7 24 2 <sup>s</sup> 63	22 54 38 <sup>°</sup> 8	16 <sup>''</sup> 22	9	9 10 27 <sup>s</sup> 97	19 24 32 <sup>°</sup> 2	70 <sup>''</sup> 23
10	7 26 16 <sup>s</sup> 31	22 52 58 <sup>°</sup> 0	17 <sup>''</sup> 39	10	9 12 39 <sup>s</sup> 42	19 17 27 <sup>°</sup> 7	71 <sup>''</sup> 27
11	7 28 30 <sup>s</sup> 01	22 51 10 <sup>°</sup> 1	18 <sup>''</sup> 56	11	9 14 50 <sup>s</sup> 78	19 10 16 <sup>°</sup> 9	72 <sup>''</sup> 31
12	7 30 43 <sup>s</sup> 71	22 49 15 <sup>°</sup> 3	19 <sup>''</sup> 73	12	9 17 2 <sup>s</sup> 05	19 3 0 <sup>°</sup> 0	73 <sup>''</sup> 33
13	7 32 57 <sup>s</sup> 43	22 47 13 <sup>°</sup> 4	20 <sup>''</sup> 90	13	9 19 13 <sup>s</sup> 23	18 55 37 <sup>°</sup> 0	74 <sup>''</sup> 35
14	7 35 11 <sup>s</sup> 15	22 45 4 <sup>°</sup> 5	22 <sup>''</sup> 07	14	9 21 24 <sup>s</sup> 31	18 48 7 <sup>°</sup> 8	75 <sup>''</sup> 37
15	7 37 24 <sup>s</sup> 88	22 42 48 <sup>°</sup> 6	23 <sup>''</sup> 24	15	9 23 35 <sup>s</sup> 30	18 40 32 <sup>°</sup> 6	76 <sup>''</sup> 37
16	7 39 38 <sup>s</sup> 61	22 40 25 <sup>°</sup> 6	24 <sup>''</sup> 42	16	9 25 46 <sup>s</sup> 19	18 32 51 <sup>°</sup> 4	77 <sup>''</sup> 37
17	7 41 52 <sup>s</sup> 33	22 37 55 <sup>°</sup> 6	25 <sup>''</sup> 58	17	9 27 56 <sup>s</sup> 99	18 25 4 <sup>°</sup> 2	78 <sup>''</sup> 36
18	7 44 6 <sup>s</sup> 05	22 35 18 <sup>°</sup> 7	26 <sup>''</sup> 74	18	9 30 7 <sup>s</sup> 70	18 17 11 <sup>°</sup> 1	79 <sup>''</sup> 35
19	7 46 19 <sup>s</sup> 76	22 32 34 <sup>°</sup> 7	27 <sup>''</sup> 91	19	9 32 18 <sup>s</sup> 31	18 9 12 <sup>°</sup> 0	80 <sup>''</sup> 34
20	7 48 33 <sup>s</sup> 46	22 29 43 <sup>°</sup> 8	29 <sup>''</sup> 08	20	9 34 28 <sup>s</sup> 82	18 1 7 <sup>°</sup> 0	81 <sup>''</sup> 32
21	7 50 47 <sup>s</sup> 14	22 26 45 <sup>°</sup> 8	30 <sup>''</sup> 24	21	9 36 39 <sup>s</sup> 24	17 52 56 <sup>°</sup> 2	82 <sup>''</sup> 29
22	7 53 0 <sup>s</sup> 80	22 23 40 <sup>°</sup> 9	31 <sup>''</sup> 40	22	9 38 49 <sup>s</sup> 57	17 44 39 <sup>°</sup> 5	83 <sup>''</sup> 26
23	7 55 14 <sup>s</sup> 44	22 20 29 <sup>°</sup> 0	32 <sup>''</sup> 56	23	9 40 59 <sup>s</sup> 80	17 36 17 <sup>°</sup> 1	84 <sup>''</sup> 22
24	7 57 28 <sup>s</sup> 06	N. 22 17 10 <sup>°</sup> 2	33 <sup>''</sup> 72	24	9 43 9 <sup>s</sup> 94	N. 17 27 48 <sup>°</sup> 9	85 <sup>''</sup> 17



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>TUESDAY 13.</b>				<b>THURSDAY 15.</b>			
0	h m s	° ' "	"	0	h m s	° ' "	"
0	9 43 9.94	N. 17 27 48.9	85.17	0	11 25 44.15	N. 9 2 21.1	132.49
1	9 45 19.98	17 19 15.0	86.12	1	11 27 51.16	8 50 4.4	133.07
2	9 47 29.93	17 10 35.5	87.06	2	11 29 58.16	8 37 44.2	133.64
3	9 49 39.78	17 1 50.3	88.00	3	11 32 5.16	8 25 20.7	134.20
4	9 51 49.54	16 52 59.5	88.92	4	11 34 12.16	8 12 53.8	134.76
5	9 53 59.21	16 44 3.2	89.84	5	11 36 19.16	8 0 23.6	135.30
6	9 56 8.79	16 35 1.4	90.76	6	11 38 26.16	7 47 50.2	135.83
7	9 58 18.27	16 25 54.1	91.67	7	11 40 33.17	7 35 13.6	136.36
8	10 0 27.66	16 16 41.4	92.57	8	11 42 40.19	7 22 33.9	136.87
9	10 2 36.96	16 7 23.3	93.47	9	11 44 47.22	7 9 51.2	137.37
10	10 4 46.17	15 57 59.8	94.36	10	11 46 54.28	6 57 5.4	137.87
11	10 6 55.29	15 48 31.0	95.23	11	11 49 1.35	6 44 16.7	138.35
12	10 9 4.32	15 38 57.0	96.11	12	11 51 8.45	6 31 25.2	138.82
13	10 11 13.27	15 29 17.7	96.98	13	11 53 15.58	6 18 30.8	139.29
14	10 13 22.13	15 19 33.3	97.83	14	11 55 22.74	6 5 33.7	139.75
15	10 15 30.90	15 9 43.7	98.69	15	11 57 29.94	5 52 33.8	130.20
16	10 17 39.60	14 59 49.0	99.54	16	11 59 37.17	5 39 31.3	130.63
17	10 19 48.21	14 49 49.2	100.38	17	12 1 44.45	5 26 26.2	131.06
18	10 21 56.74	14 39 44.4	101.21	18	12 3 51.77	5 13 18.6	131.48
19	10 24 5.19	14 29 34.7	102.03	19	12 5 59.15	5 0 8.5	131.88
20	10 26 13.56	14 19 20.1	102.84	20	12 8 6.58	4 46 56.0	132.28
21	10 28 21.86	14 9 0.6	103.66	21	12 10 14.06	4 33 41.1	132.67
22	10 30 30.08	13 58 36.2	104.46	22	12 12 21.60	4 20 24.0	133.03
23	10 32 38.23	N. 13 48 7.1	105.25	23	12 14 29.21	N. 4 7 4.7	133.40
<b>WEDNESDAY 14.</b>				<b>FRIDAY 16.</b>			
0	10 34 46.30	N. 13 37 33.2	106.04	0	12 16 36.89	N. 3 53 43.2	133.75
1	10 36 54.31	13 26 54.6	106.82	1	12 18 44.64	3 40 19.7	134.09
2	10 39 2.25	13 16 11.4	107.58	2	12 20 52.47	3 26 54.1	134.42
3	10 41 10.12	13 5 23.6	108.35	3	12 23 0.37	3 13 26.6	134.74
4	10 43 17.93	12 54 31.2	109.11	4	12 25 8.36	2 59 57.2	135.06
5	10 45 25.67	12 43 34.3	109.86	5	12 27 16.44	2 46 25.9	135.36
6	10 47 33.36	12 32 32.9	110.60	6	12 29 24.61	2 32 52.9	135.64
7	10 49 40.99	12 21 27.1	111.33	7	12 31 32.88	2 19 18.2	135.92
8	10 51 48.56	12 10 17.0	112.05	8	12 33 41.24	2 5 41.9	136.18
9	10 53 56.08	11 59 2.5	112.77	9	12 35 49.71	1 52 4.1	136.43
10	10 56 3.55	11 47 43.8	113.47	10	12 37 58.29	1 38 24.7	136.68
11	10 58 10.97	11 36 20.9	114.17	11	12 40 6.98	1 24 43.9	136.91
12	11 0 18.35	11 24 53.7	114.87	12	12 42 15.78	1 11 1.8	137.13
13	11 2 25.68	11 13 22.4	115.55	13	12 44 24.70	0 57 18.4	137.33
14	11 4 32.97	11 1 47.1	116.22	14	12 46 33.75	0 43 33.8	137.52
15	11 6 40.22	10 50 7.8	116.89	15	12 48 42.92	0 29 48.1	137.71
16	11 8 47.43	10 38 24.4	117.55	16	12 50 52.22	0 16 1.3	137.88
17	11 10 54.61	10 26 37.2	118.19	17	12 53 1.66	N. 0 2 13.5	138.04
18	11 13 1.76	10 14 46.1	118.83	18	12 55 11.24	S. 0 11 35.2	138.18
19	11 15 8.88	10 2 51.2	119.47	19	12 57 20.96	0 25 24.7	138.32
20	11 17 15.97	9 50 52.5	120.09	20	12 59 30.83	0 39 15.0	138.43
21	11 19 23.04	9 38 50.1	120.71	21	13 1 40.85	0 53 5.9	138.54
22	11 21 30.09	9 26 44.0	121.32	22	13 3 51.03	1 6 57.5	138.64
23	11 23 37.13	9 14 34.3	121.91	23	13 6 1.37	1 20 49.6	138.73
24	11 25 44.15	N. 9 2 21.1	122.49	24	13 8 11.87	S. 1 34 42.2	138.80



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
SATURDAY 17.				MONDAY 19.			
0	<sup>h</sup> 13 <sup>m</sup> 8 <sup>s</sup> 11.87	S. 1 34 42.2	138.80	0	<sup>h</sup> 14 <sup>m</sup> 57 <sup>s</sup> 3.49	S. 12 21 31.2	124.66
1	13 10 22.54	1 48 35.2	138.85	1	14 59 26.50	12 33 57.1	123.97
2	13 12 33.38	2 2 28.4	138.89	2	15 1 49.83	12 46 18.8	123.25
3	13 14 44.40	2 16 21.9	138.92	3	15 4 13.49	12 58 36.1	122.51
4	13 16 55.59	2 30 15.5	138.93	4	15 6 37.47	13 10 48.9	121.76
5	13 19 6.97	2 44 9.1	138.93	5	15 9 1.79	13 22 57.2	120.98
6	13 21 18.54	2 58 2.7	138.93	6	15 11 26.43	13 35 0.7	120.19
7	13 23 30.30	3 11 56.3	138.91	7	15 13 51.41	13 46 59.5	119.39
8	13 25 42.26	3 25 49.6	138.86	8	15 16 16.72	13 58 53.4	118.57
9	13 27 54.42	3 39 42.6	138.81	9	15 18 42.36	14 10 42.3	117.73
10	13 30 6.78	3 53 35.3	138.75	10	15 21 8.33	14 22 26.1	116.87
11	13 32 19.35	4 7 27.6	138.67	11	15 23 34.63	14 34 4.7	115.99
12	13 34 32.14	4 21 19.3	138.57	12	15 26 1.27	14 45 38.0	115.09
13	13 36 45.14	4 35 10.4	138.46	13	15 28 28.24	14 57 5.8	114.18
14	13 38 58.36	4 49 0.8	138.33	14	15 30 55.55	15 8 28.1	113.25
15	13 41 11.80	5 2 50.4	138.19	15	15 33 23.19	15 19 44.8	112.29
16	13 43 25.47	5 16 39.1	138.04	16	15 35 51.16	15 30 55.6	111.32
17	13 45 39.37	5 30 26.9	137.87	17	15 38 19.47	15 42 0.6	110.34
18	13 47 53.50	5 44 13.6	137.69	18	15 40 48.11	15 52 59.7	109.34
19	13 50 7.88	5 57 59.2	137.49	19	15 43 17.08	16 3 52.7	108.31
20	13 52 22.49	6 11 43.5	137.27	20	15 45 46.38	16 14 39.4	107.27
21	13 54 37.35	6 25 26.5	137.04	21	15 48 16.01	16 25 19.9	106.22
22	13 56 52.46	6 39 8.0	136.80	22	15 50 45.97	16 35 54.0	105.14
23	13 59 7.83	S. 6 52 48.1	136.55	23	15 53 16.25	S. 16 46 21.6	104.05
SUNDAY 18.				TUESDAY 20.			
0	14 1 23.45	S. 7 6 26.6	136.27	0	15 55 46.86	S. 16 56 42.6	102.94
1	14 3 39.33	7 20 3.3	135.98	1	15 58 17.79	17 6 56.9	101.81
2	14 5 55.47	7 33 38.3	135.67	2	16 0 49.05	17 17 4.3	100.66
3	14 8 11.88	7 47 11.3	135.34	3	16 3 20.62	17 27 4.8	99.51
4	14 10 28.56	8 0 42.3	135.00	4	16 5 52.51	17 36 58.4	98.33
5	14 12 45.51	8 14 11.3	134.64	5	16 8 24.72	17 46 44.8	97.13
6	14 15 2.74	8 27 38.0	134.27	6	16 10 57.23	17 56 23.9	95.92
7	14 17 20.25	8 41 2.5	133.88	7	16 13 30.06	18 5 55.8	94.69
8	14 19 38.05	8 54 24.6	133.48	8	16 16 3.19	18 15 20.2	93.44
9	14 21 56.13	9 7 44.3	133.06	9	16 18 36.63	18 24 37.1	92.19
10	14 24 14.50	9 21 1.3	132.62	10	16 21 10.36	18 33 46.5	90.92
11	14 26 33.16	9 34 15.7	132.16	11	16 23 44.39	18 42 48.1	89.62
12	14 28 52.11	9 47 27.2	131.68	12	16 26 18.72	18 51 41.9	88.31
13	14 31 11.36	10 0 35.9	131.20	13	16 28 53.33	19 0 27.8	86.98
14	14 33 30.92	10 13 41.6	130.69	14	16 31 28.23	19 9 5.7	85.64
15	14 35 50.77	10 26 44.2	130.17	15	16 34 3.41	19 17 35.5	84.29
16	14 38 10.93	10 39 43.6	129.63	16	16 36 38.86	19 25 57.2	82.93
17	14 40 31.40	10 52 39.7	129.07	17	16 39 14.59	19 34 10.6	81.53
18	14 42 52.18	11 5 32.4	128.49	18	16 41 50.59	19 42 15.6	80.14
19	14 45 13.27	11 18 21.6	127.90	19	16 44 26.84	19 50 12.3	78.73
20	14 47 34.68	11 31 7.2	127.28	20	16 47 3.35	19 58 6.4	77.30
21	14 49 56.40	11 43 49.0	126.66	21	16 49 40.11	20 5 39.9	75.87
22	14 52 18.44	11 56 27.1	126.02	22	16 52 17.12	20 13 10.8	74.42
23	14 54 40.80	12 9 1.2	125.34	23	16 54 54.37	20 20 32.9	72.95
24	14 57 3.49	S. 12 21 31.2	124.66	24	16 57 31.85	S. 20 27 46.2	71.47



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.			Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.			Declination.	Diff. Dec. for 10 <sup>m</sup> .			
WEDNESDAY 21.						FRIDAY 23.								
0	h	m	s	°	'	"	0	h	m	s	°	'	"	
1	16	57	31.85	S. 20	27	46.2	71.47	19	5	37.53	S. 23	4	22.5	7.60
2	17	0	9.56	20	34	50.5	69.98	19	8	16.74	23	3	31.9	9.26
3	17	2	47.49	20	41	45.9	68.47	19	10	55.76	23	2	31.4	10.90
4	17	5	25.64	20	48	32.2	66.95	19	13	34.59	23	1	21.1	12.53
5	17	8	4.00	20	55	9.3	65.42	19	16	13.21	23	0	1.0	14.17
6	17	10	42.56	21	1	37.2	63.88	19	18	51.62	22	58	31.1	15.79
7	17	13	21.31	21	7	55.9	62.34	19	21	29.81	22	56	51.5	17.41
8	17	16	0.25	21	14	5.3	60.78	19	24	7.77	22	55	2.2	19.02
9	17	18	39.38	21	20	5.3	59.21	19	26	45.49	22	53	3.3	20.62
10	17	21	18.68	21	25	55.8	57.63	19	29	22.97	22	50	54.8	22.21
11	17	23	58.14	21	31	36.8	56.04	19	32	0.20	22	48	36.8	23.79
12	17	26	37.76	21	37	8.3	54.44	19	34	37.17	22	46	9.3	25.37
13	17	29	17.54	21	42	30.1	52.83	19	37	13.87	22	43	32.4	26.93
14	17	31	57.46	21	47	42.2	51.21	19	39	50.30	22	40	46.1	28.48
15	17	34	37.52	21	52	44.6	49.59	19	42	26.44	22	37	50.6	30.02
16	17	37	17.70	21	57	37.3	47.96	19	45	2.30	22	34	45.9	31.55
17	17	39	58.00	22	2	20.1	46.31	19	47	37.86	22	31	32.0	33.07
18	17	42	38.41	22	6	53.0	44.67	19	50	13.12	22	28	9.0	34.59
19	17	45	18.92	22	11	16.1	43.02	19	52	48.07	22	24	36.9	36.09
20	17	47	59.53	22	15	29.2	41.35	19	55	22.70	22	20	55.9	37.57
21	17	50	40.22	22	19	32.3	39.68	20	19	57.02	22	17	6.1	39.05
22	17	53	21.00	22	23	25.4	38.02	21	20	0 31.01	22	13	7.4	40.52
23	17	56	1.84	22	27	8.5	36.35	21	20	3 4.67	22	8	59.9	41.97
24	17	58	42.74	S. 22	30	41.6	34.67	22	20	5 37.99	S. 22	4	43.8	43.40
THURSDAY 22.						SATURDAY 24.								
0	18	1	23.68	S. 22	34	4.5	32.98	0	20	8 10.97	S. 22	0	19.2	44.82
1	18	4	4.67	22	37	17.3	31.29	1	20	10 43.60	21	55	46.0	46.23
2	18	6	45.69	22	40	20.0	29.60	2	20	13 15.87	21	51	4.4	47.63
3	18	9	26.74	22	43	12.5	27.90	3	20	15 47.78	21	46	14.4	49.02
4	18	12	7.80	22	45	54.8	26.20	4	20	18 19.34	21	41	16.2	50.39
5	18	14	48.86	22	48	26.9	24.51	5	20	20 50.52	21	36	9.7	51.75
6	18	17	29.92	22	50	48.9	22.81	6	20	23 21.33	21	30	55.1	53.10
7	18	20	10.96	22	53	0.6	21.10	7	20	25 51.77	21	25	32.5	54.43
8	18	22	51.98	22	55	2.1	19.40	8	20	28 21.82	21	20	2.0	55.74
9	18	25	32.97	22	56	53.4	17.70	9	20	30 51.49	21	14	23.6	57.05
10	18	28	13.91	22	58	34.5	16.00	10	20	33 20.77	21	8	37.4	58.34
11	18	30	54.81	23	0	5.4	14.29	11	20	35 49.66	21	2	43.5	59.62
12	18	33	35.64	23	1	26.0	12.59	12	20	38 18.16	20	56	42.0	60.88
13	18	36	16.40	23	2	36.5	10.89	13	20	40 46.26	20	50	33.0	62.12
14	18	38	57.08	23	3	36.7	9.19	14	20	43 13.96	20	44	16.6	63.35
15	18	41	37.68	23	4	26.8	7.50	15	20	45 41.25	20	37	52.8	64.57
16	18	44	18.18	23	5	6.7	5.81	16	20	48 8.13	20	31	21.7	65.77
17	18	46	58.56	23	5	36.5	4.12	17	20	50 34.61	20	24	43.5	66.96
18	18	49	38.83	23	5	56.1	2.43	18	20	53 0.68	20	17	58.2	68.13
19	18	52	18.98	23	6	5.6	0.75	19	20	55 26.33	20	11	6.0	69.28
20	18	54	59.00	23	6	5.1	0.93	20	20	57 51.57	20	4	6.8	70.43
21	18	57	38.87	23	5	54.5	2.61	21	21	0 16.39	19	57	0.8	71.56
22	19	0	18.59	23	5	33.8	4.28	22	21	2 40.79	19	49	48.1	72.67
23	19	2	58.15	23	5	3.1	5.94	23	21	5 4.78	19	42	28.7	73.77
24	19	5	37.53	S. 23	4	22.5	7.60	24	21	7 28.34	S. 19	35	2.8	74.85



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>SUNDAY 25.</b>				<b>TUESDAY 27.</b>			
0	21 7 28.34	S. 19 35 2.8	74.85	0	22 54 14.01	S. 11 58 46.5	110.00
1	21 9 51.48	19 27 30.5	75.92	1	22 56 18.13	11 47 45.2	110.42
2	21 12 14.20	19 19 51.8	76.98	2	22 58 21.91	11 36 41.4	110.83
3	21 14 36.49	19 12 6.8	78.01	3	23 0 25.36	11 25 35.3	111.22
4	21 16 58.36	19 4 15.7	79.03	4	23 2 28.49	11 14 26.8	111.61
5	21 19 19.81	18 56 18.4	80.04	5	23 4 31.30	11 3 16.0	111.98
6	21 21 40.83	18 48 15.2	81.03	6	23 6 33.79	10 52 3.0	112.34
7	21 24 1.42	18 40 6.0	82.01	7	23 8 35.97	10 40 47.9	112.68
8	21 26 21.59	18 31 51.1	82.97	8	23 10 37.84	10 29 30.8	113.02
9	21 28 41.33	18 23 30.4	83.92	9	23 12 39.41	10 18 11.6	113.36
10	21 31 0.65	18 15 4.0	84.86	10	23 14 40.67	10 6 50.5	113.68
11	21 33 19.55	18 6 32.1	85.77	11	23 16 41.63	9 55 27.5	113.99
12	21 35 38.02	17 57 54.8	86.67	12	23 18 42.30	9 44 2.6	114.29
13	21 37 56.07	17 49 12.1	87.56	13	23 20 42.68	9 32 36.0	114.58
14	21 40 13.69	17 40 24.1	88.43	14	23 22 42.78	9 21 7.6	114.87
15	21 42 30.89	17 31 30.9	89.29	15	23 24 42.60	9 9 37.6	115.13
16	21 44 47.67	17 22 32.6	90.13	16	23 26 42.14	8 58 6.0	115.40
17	21 47 4.04	17 13 29.3	90.96	17	23 28 41.40	8 46 32.8	115.65
18	21 49 19.98	17 4 21.1	91.78	18	23 30 40.40	8 34 58.1	115.90
19	21 51 35.51	16 55 8.0	92.58	19	23 32 39.13	8 23 22.0	116.13
20	21 53 50.62	16 45 50.1	93.37	20	23 34 37.60	8 11 44.6	116.35
21	21 56 5.32	16 36 27.5	94.14	21	23 36 35.82	8 0 5.8	116.57
22	21 58 19.60	16 27 0.4	94.90	22	23 38 33.78	7 48 25.7	116.77
23	22 0 33.48	S. 16 17 28.7	95.64	23	23 40 31.49	S. 7 36 44.5	116.97
<b>MONDAY 26.</b>				<b>WEDNESDAY 28.</b>			
0	22 2 46.94	S. 16 7 52.7	96.37	0	23 42 28.96	S. 7 25 2.1	117.16
1	22 5 0.00	15 58 12.3	97.09	1	23 44 26.19	7 13 18.6	117.34
2	22 7 12.65	15 48 27.6	97.79	2	23 46 23.18	7 1 34.0	117.52
3	22 9 24.90	15 38 38.8	98.48	3	23 48 19.94	6 49 48.4	117.68
4	22 11 36.76	15 28 45.8	99.17	4	23 50 16.47	6 38 1.9	117.83
5	22 13 48.21	15 18 48.8	99.83	5	23 52 12.78	6 26 14.4	117.98
6	22 15 59.27	15 8 47.9	100.47	6	23 54 8.87	6 14 26.1	118.12
7	22 18 9.94	14 58 43.2	101.11	7	23 56 4.75	6 2 37.0	118.24
8	22 20 20.22	14 48 34.6	101.73	8	23 58 0.41	5 50 47.2	118.37
9	22 22 30.11	14 38 22.4	102.34	9	23 59 55.87	5 38 56.6	118.48
10	22 24 39.61	14 28 6.5	102.94	10	0 1 51.12	5 27 5.4	118.59
11	22 26 48.73	14 17 47.1	103.52	11	0 3 46.17	5 15 13.5	118.69
12	22 28 57.48	14 7 24.2	104.09	12	0 5 41.04	5 3 21.1	118.78
13	22 31 5.85	13 56 58.0	104.65	13	0 7 35.71	4 51 28.2	118.86
14	22 33 13.84	13 46 28.4	105.20	14	0 9 30.20	4 39 34.8	118.93
15	22 35 21.47	13 35 55.6	105.73	15	0 11 24.51	4 27 41.0	119.00
16	22 37 28.73	13 25 19.6	106.25	16	0 13 18.63	4 15 46.8	119.07
17	22 39 35.62	13 14 40.6	106.76	17	0 15 12.59	4 3 52.2	119.12
18	22 41 42.16	13 3 58.5	107.27	18	0 17 6.38	3 51 57.4	119.16
19	22 43 48.34	12 53 13.4	107.75	19	0 19 0.00	3 40 2.3	119.19
20	22 45 54.16	12 42 25.5	108.22	20	0 20 53.46	3 28 7.1	119.23
21	22 47 59.64	12 31 34.8	108.68	21	0 22 46.77	3 16 11.6	119.26
22	22 50 4.77	12 20 41.3	109.13	22	0 24 39.92	3 4 16.0	119.27
23	22 52 9.56	12 9 45.2	109.57	23	0 26 32.92	2 52 20.4	119.27
24	22 54 14.01	S. 11 58 46.5	110.00	24	0 28 25.78	S. 2 40 24.8	119.27



## MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .	Hour.	Right Ascension.	Declination.	Diff. Dec. for 10 <sup>m</sup> .
<b>THURSDAY 29.</b>				<b>SATURDAY 31.</b>			
0	<sup>h</sup> 0 <sup>m</sup> 28 <sup>s</sup> 25.78	S. 2 40 24.8	119.27	0	<sup>h</sup> 1 57 <sup>m</sup> 13 <sup>s</sup> 39	N. 6 40 10.0	111.97
1	0 30 18.50	2 28 29.1	119.27	1	1 59 4.09	6 51 20.9	111.66
2	0 32 11.09	2 16 33.5	119.26	2	2 0 54.85	7 2 29.9	111.35
3	0 34 3.54	2 4 38.0	119.24	3	2 2 45.66	7 13 37.1	111.05
4	0 35 55.87	1 52 42.6	119.22	4	2 4 36.52	7 24 42.5	110.73
5	0 37 48.08	1 40 47.4	119.18	5	2 6 27.44	7 35 45.9	110.41
6	0 39 40.16	1 28 52.4	119.15	6	2 8 18.43	7 46 47.4	110.08
7	0 41 32.13	1 16 57.6	119.11	7	2 10 9.48	7 57 46.9	109.74
8	0 43 24.00	1 5 3.1	119.06	8	2 12 0.60	8 8 44.3	109.40
9	0 45 15.75	0 53 8.9	119.00	9	2 13 51.80	8 19 39.7	109.07
10	0 47 7.40	0 41 15.1	118.93	10	2 15 43.08	8 30 33.1	108.75
11	0 48 58.96	0 29 21.7	118.86	11	2 17 34.43	8 41 24.3	108.35
12	0 50 50.42	0 17 28.8	118.78	12	2 19 25.87	8 52 13.3	107.98
13	0 52 41.79	S. 0 5 36.4	118.69	13	2 21 17.39	9 3 0.1	107.62
14	0 54 33.07	N. 0 6 15.5	118.61	14	2 23 9.00	9 13 44.7	107.25
15	0 56 24.27	0 18 6.9	118.52	15	2 25 0.71	9 24 27.1	106.87
16	0 58 15.39	0 29 57.7	118.41	16	2 26 52.51	9 35 7.1	106.48
17	1 0 6.44	0 41 47.8	118.30	17	2 28 44.41	9 45 44.8	106.08
18	1 1 57.42	0 53 37.3	118.19	18	2 30 36.41	9 56 20.1	105.68
19	1 3 48.34	1 5 26.1	118.07	19	2 32 28.52	10 6 53.0	105.28
20	1 5 39.19	1 17 14.1	117.93	20	2 34 20.74	10 17 23.5	104.87
21	1 7 29.98	1 29 1.3	117.80	21	2 36 13.06	10 27 51.4	104.44
22	1 9 20.72	1 40 47.7	117.67	22	2 38 5.50	10 38 16.8	104.02
23	1 11 11.41	N. 1 52 33.3	117.52	23	2 39 58.06	N. 10 48 39.7	103.59
<b>FRIDAY 30.</b>				<b>SUNDAY, JAN. 1, 1871.</b>			
0	1 13 2.05	N. 2 4 17.9	117.36	0	2 41 50.74	N. 10 58 59.9	103.14
1	1 14 52.65	2 16 1.6	117.21				
2	1 16 43.21	2 27 44.4	117.05				
3	1 18 33.73	2 39 26.2	116.88				
4	1 20 24.23	2 51 6.9	116.70				
5	1 22 14.70	3 2 46.6	116.52				
6	1 24 5.14	3 14 25.1	116.33				
7	1 25 55.56	3 26 2.5	116.14				
8	1 27 45.97	3 37 38.8	115.94				
9	1 29 36.36	3 49 13.8	115.73				
10	1 31 26.75	4 0 47.6	115.52				
11	1 33 17.13	4 12 20.1	115.31				
12	1 35 7.52	4 23 51.3	115.08				
13	1 36 57.91	4 35 21.1	114.86				
14	1 38 48.30	4 46 49.6	114.63				
15	1 40 38.70	4 58 16.6	114.38				
16	1 42 29.12	5 9 42.2	114.14				
17	1 44 19.55	5 21 6.3	113.88				
18	1 46 10.01	5 32 28.8	113.63				
19	1 48 0.49	5 43 49.8	113.37				
20	1 49 51.00	5 55 9.2	113.09				
21	1 51 41.54	6 6 26.9	112.82				
22	1 53 32.12	6 17 43.0	112.53				
23	1 55 22.73	6 28 57.3	112.25				
24	1 57 13.39	N. 6 40 10.0	111.97				

## PHASES OF THE MOON.

Dec. 7	○ Full Moon	- -	<sup>h</sup> 14 <sup>m</sup> 39 <sup>s</sup> 0
15	☾ Last Quarter	- -	9 10 5
22	● New Moon	- -	0 18 6
29	☾ First Quarter	- -	4 38 2

Dec. 5	☾ Apogee	- - - -	<sup>h</sup> 3
20	☾ Perigee	- - - -	16



MEAN TIME.									
LUNAR DISTANCES.									
Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
1	Sun W.	107 45 54	3323	109 9 36	3336	110 33 6	3346	111 56 24	3357
	α Aquilæ W.	64 34 31	3783	65 49 51	3773	67 5 21	3764	68 21 1	3757
	Fomalhaut W.	29 2 8	3878	30 15 50	3866	31 30 46	3745	32 46 46	3692
	α Arietis E.	41 32 19	3297	40 8 4	3329	38 44 26	3364	37 21 29	3402
	Aldebaran E.	70 39 30	2949	69 8 13	2959	67 37 9	2969	66 6 17	2978
	Jupiter E.	85 59 6	2899	84 26 46	2909	82 54 38	2918	81 22 42	2927
2	Sun W.	118 50 13	3400	120 12 30	3407	121 34 39	3414	122 56 40	3420
	α Aquilæ W.	74 40 59	3731	75 57 13	3728	77 13 30	3726	78 29 49	3725
	Fomalhaut W.	39 18 36	3516	40 38 43	3493	41 59 15	3472	43 20 11	3454
	α Pegasi W.	30 0 58	5362	30 53 20	5165	31 48 8	4991	32 45 10	4838
	Aldebaran E.	58 34 40	3018	57 4 49	3025	55 35 7	3031	54 5 33	3037
	Jupiter E.	73 45 41	2965	72 14 44	2972	70 43 56	2978	69 13 16	2984
3	Sun W.	129 45 5	3447	131 6 29	3451	132 27 48	3455	133 49 3	3458
	α Aquilæ W.	84 51 37	3725	86 7 58	3726	87 24 18	3728	88 40 35	3730
	Fomalhaut W.	50 9 19	3387	51 31 50	3377	52 54 33	3367	54 17 27	3359
	α Pegasi W.	37 57 25	4306	39 4 12	4231	40 12 9	4164	41 21 9	4103
	Aldebaran E.	46 39 27	3062	45 10 31	3067	43 41 41	3071	42 12 56	3074
	Jupiter E.	61 41 34	3007	60 11 30	3011	58 41 31	3014	57 11 35	3017
	Pollux E.	90 54 26	3075	89 25 46	3078	87 57 10	3082	86 28 38	3085
4	Fomalhaut W.	61 14 4	3326	62 37 45	3320	64 1 33	3315	65 25 27	3310
	α Pegasi W.	47 19 15	3874	48 33 1	3839	49 47 23	3808	51 2 17	3778
	Aldebaran E.	34 50 9	3088	33 21 45	3091	31 53 25	3093	30 25 7	3096
	Jupiter E.	49 42 44	3027	48 13 5	3028	46 43 27	3029	45 13 50	3030
	Pollux E.	79 6 47	3096	77 38 32	3097	76 10 18	3098	74 42 6	3099
5	Fomalhaut W.	72 26 22	3287	73 50 49	3283	75 15 20	3279	76 39 56	3275
	α Pegasi W.	57 23 49	3660	58 41 19	3641	59 59 9	3623	61 17 19	3607
	Jupiter E.	37 45 50	3029	36 16 13	3027	34 46 34	3027	33 16 55	3026
	Pollux E.	67 21 16	3100	65 53 6	3099	64 24 55	3099	62 56 44	3099
	Regulus E.	103 10 14	3083	101 41 43	3082	100 13 11	3081	98 44 38	3079
6	α Pegasi W.	67 52 19	3535	69 12 4	3524	70 32 1	3513	71 52 11	3503
	α Arietis W.	24 47 54	3992	25 59 42	3895	27 13 7	3811	28 27 58	3739
	Pollux E.	55 35 33	3092	54 7 14	3091	52 38 54	3090	51 10 32	3088
	Regulus E.	91 21 20	3069	89 52 32	3066	88 23 41	3064	86 54 47	3061
	Mars E.	113 17 34	3241	111 52 14	3238	110 26 50	3235	109 1 22	3232
7	α Pegasi W.	78 35 44	3457	79 56 56	3449	81 18 17	3443	82 39 45	3435
	α Arietis W.	34 58 24	3490	36 18 59	3455	37 40 13	3423	39 2 3	3395
	Pollux E.	43 48 14	3081	42 19 41	3080	40 51 7	3078	39 22 31	3078
	Regulus E.	79 29 20	3043	78 0 1	3040	76 30 38	3037	75 1 11	3032
	Mars E.	101 53 2	3213	100 27 8	3209	99 1 9	3204	97 35 5	3200
8	α Pegasi W.	89 28 56	3407	90 51 4	3403	92 13 17	3398	93 35 36	3395
	α Arietis W.	45 58 33	3282	47 23 5	3264	48 47 59	3247	50 13 12	3231
	Pollux E.	31 59 29	3080	30 30 55	3083	29 2 25	3086	27 33 58	3091
	Regulus E.	67 32 37	3011	66 2 38	3006	64 32 33	3001	63 2 22	2997
	Mars E.	90 23 23	3176	88 56 45	3171	87 30 1	3165	86 3 10	3160
9	α Arietis W.	57 23 45	3162	58 50 39	3150	60 17 48	3138	61 45 11	3127
	Aldebaran W.	24 58 45	2985	26 29 17	2977	27 59 59	2969	29 30 50	2961



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
1	Sun W.	113 19 30	3366	114 42 26	3375	116 5 11	3383	117 27 47	3392
	α Aquilæ W.	69 36 48	3750	70 52 43	3744	72 8 44	3740	73 24 49	3735
	Fomalhaut W.	34 3 41	3646	35 21 26	3607	36 39 53	3572	37 58 58	3542
	α Arietis E.	35 59 15	3443	34 37 47	3488	33 17 10	3538	31 57 28	3592
	Aldebaran E.	64 35 37	2986	63 5 7	2995	61 34 48	3003	60 4 39	3011
	Jupiter E.	79 50 57	2936	78 19 23	2944	76 48 0	2951	75 16 45	2959
2	Sun W.	124 18 34	3426	125 40 21	3431	127 2 2	3437	128 23 36	3442
	α Aquilæ W.	79 46 10	3725	81 2 31	3722	82 18 53	3722	83 35 15	3722
	Fomalhaut W.	44 41 27	3437	46 3 2	3422	47 24 53	3409	48 46 59	3397
	α Pegasi W.	33 44 15	4795	34 45 10	4587	35 47 46	4482	36 51 54	4389
	Aldebaran E.	52 36 6	3043	51 6 47	3048	49 37 34	3054	48 8 28	3058
	Jupiter E.	67 42 43	2989	66 12 17	2994	64 41 57	2999	63 11 43	3003
3	Sun W.	135 10 14	3461	136 31 22	3464	137 52 26	3466	139 13 28	3469
	α Aquilæ W.	89 56 50	3732	91 13 3	3736	92 29 12	3739	93 45 18	3744
	Fomalhaut W.	55 40 30	3352	57 3 41	3345	58 27 1	3338	59 50 29	3331
	α Pegasi W.	42 31 8	4048	43 42 0	3998	44 53 41	3953	46 6 8	3912
	Aldebaran E.	40 44 15	3078	39 15 38	3081	37 47 5	3083	36 18 35	3086
	Jupiter E.	55 41 43	3020	54 11 55	3022	52 42 9	3024	51 12 26	3025
	Pollux E.	85 0 10	3087	83 31 45	3090	82 3 23	3092	80 35 4	3094
4	Fomalhaut W.	66 49 27	3305	68 13 33	3300	69 37 44	3295	71 2 1	3292
	α Pegasi W.	52 17 42	3750	53 33 36	3725	54 49 56	3702	56 6 41	3680
	Aldebaran E.	28 56 52	3097	27 28 39	3100	26 0 29	3103	24 32 23	3105
	Jupiter E.	43 44 14	3030	42 14 38	3030	40 45 2	3030	39 15 26	3030
	Pollux E.	73 13 55	3100	71 45 45	3100	70 17 35	3100	68 49 25	3100
5	Fomalhaut W.	78 4 37	3271	79 29 22	3267	80 54 12	3264	82 19 6	3260
	α Pegasi W.	62 35 46	3590	63 54 31	3575	65 13 32	3562	66 32 48	3548
	Jupiter E.	31 47 14	3024	30 17 31	3022	28 47 46	3021	27 18 0	3019
	Pollux E.	61 28 33	3097	60 0 20	3095	58 32 6	3095	57 3 50	3094
	Regulus E.	97 16 3	3078	95 47 26	3075	94 18 46	3074	92 50 4	3072
6	α Pegasi W.	73 12 32	3492	74 33 5	3483	75 53 48	3474	77 14 41	3465
	α Arietis W.	29 44 4	3677	31 1 16	3622	32 19 27	3572	33 38 32	3529
	Pollux E.	49 42 8	3087	48 13 42	3085	46 45 14	3084	45 16 45	3082
	Regulus E.	85 25 49	3058	83 56 48	3055	82 27 43	3051	80 58 33	3048
	Mars E.	107 35 51	3228	106 10 15	3225	104 44 35	3221	103 18 51	3217
7	α Pegasi W.	84 1 22	3429	85 23 5	3423	86 44 56	3417	88 6 53	3412
	α Arietis W.	40 24 25	3369	41 47 17	3345	43 10 37	3322	44 34 23	3301
	Pollux E.	37 53 55	3078	36 25 18	3078	34 56 41	3078	33 28 5	3078
	Regulus E.	73 31 38	3029	72 2 1	3024	70 32 18	3020	69 2 30	3016
	Mars E.	96 8 56	3196	94 42 42	3191	93 16 22	3185	91 49 55	3181
8	α Pegasi W.	94 57 58	3392	96 20 24	3389	97 42 53	3386	99 5 25	3385
	α Arietis W.	51 38 44	3216	53 4 34	3201	54 30 42	3188	55 57 5	3174
	Pollux E.	26 5 38	3098	24 37 26	3107	23 9 25	3118	21 41 37	3133
	Regulus E.	61 32 5	2993	60 1 43	2987	58 31 14	2981	57 0 38	2977
	Mars E.	84 36 13	3155	83 9 10	3149	81 41 59	3143	80 14 42	3137
9	α Arietis W.	63 12 48	3116	64 40 38	3105	66 8 42	3095	67 36 58	3085
	Aldebaran W.	31 1 52	2953	32 33 4	2945	34 4 26	2938	35 35 57	2931



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
9	Regulus	E.	55 29 56	2972	53 59 8	2966	52 28 13	2961	50 57 11	2955
	Mars	E.	78 47 17	3132	77 19 46	3125	75 52 6	3119	74 24 20	3112
	Spica	E.	109 26 53	2998	107 56 38	2991	106 26 14	2985	104 55 43	2978
10	α Arietis	W.	69 5 26	3074	70 34 7	3064	72 3 1	3055	73 32 6	3045
	Aldebaran	W.	37 7 37	2923	38 39 27	2915	40 11 27	2907	41 43 37	2899
	Jupiter	W.	22 54 41	2867	24 27 42	2861	26 0 51	2853	27 34 11	2845
	Regulus	E.	43 20 17	2927	41 48 32	2922	40 16 41	2916	38 44 42	2910
	Mars	E.	67 3 27	3079	65 34 52	3071	64 6 7	3065	62 37 15	3057
	Spica	E.	97 21 0	2945	95 49 38	2938	94 18 7	2931	92 46 27	2924
11	Aldebaran	W.	49 26 56	2859	51 0 7	2851	52 33 29	2843	54 7 1	2834
	Jupiter	W.	35 23 14	2807	36 57 33	2799	38 32 2	2790	40 6 43	2782
	Regulus	E.	31 3 0	2883	29 30 19	2877	27 57 31	2873	26 24 38	2869
	Mars	E.	55 10 31	3018	53 40 41	3010	52 10 41	3002	50 40 31	2993
	Spica	E.	85 5 48	2886	83 33 11	2879	82 0 25	2870	80 27 28	2862
12	Aldebaran	W.	61 57 36	2789	63 32 19	2779	65 7 15	2769	66 42 24	2759
	Jupiter	W.	48 2 54	2738	49 38 43	2728	51 14 46	2719	52 51 1	2709
	Pollux	W.	18 26 58	2984	19 57 31	2946	21 28 52	2913	23 0 55	2885
	Mars	E.	43 6 56	2949	41 35 40	2939	40 4 11	2931	38 32 31	2921
	Spica	E.	72 40 6	2821	71 6 5	2812	69 31 53	2803	67 57 29	2794
	SUN	E.	130 46 32	3149	129 19 22	3139	127 52 0	3129	126 24 25	3118
13	Aldebaran	W.	74 41 29	2707	76 18 0	2696	77 54 46	2684	79 31 48	2673
	Jupiter	W.	60 55 37	2657	62 33 15	2646	64 11 7	2635	65 49 15	2624
	Pollux	W.	30 49 2	2778	32 23 58	2760	33 59 18	2744	35 34 59	2728
	Mars	E.	30 51 8	2873	29 18 15	2863	27 45 9	2854	26 11 51	2845
	Spica	E.	60 2 31	2748	58 26 55	2739	56 51 7	2729	55 15 6	2720
	SUN	E.	119 3 7	3060	117 34 9	3048	116 4 55	3036	114 35 27	3024
14	Aldebaran	W.	87 40 51	2612	89 19 29	2599	90 58 25	2587	92 37 37	2574
	Jupiter	W.	74 3 48	2564	75 43 32	2552	77 23 33	2539	79 3 52	2527
	Pollux	W.	43 38 44	2650	45 16 31	2636	46 54 37	2621	48 33 4	2606
	Spica	E.	47 11 55	2674	45 34 40	2665	43 57 13	2657	42 19 35	2649
	SUN	E.	107 4 8	2958	105 33 2	2944	104 1 39	2931	102 29 59	2916
15	Jupiter	W.	87 29 57	2460	89 12 6	2446	90 54 35	2433	92 37 22	2419
	Pollux	W.	56 50 22	2532	58 30 51	2517	60 11 41	2502	61 52 51	2487
	Regulus	W.	20 59 1	2561	22 38 50	2539	24 19 9	2519	25 59 55	2500
	Spica	E.	34 8 58	2619	32 30 29	2616	30 51 56	2616	29 13 23	2618
	SUN	E.	94 47 4	2844	93 13 33	2829	91 39 43	2814	90 5 33	2798
16	Jupiter	W.	101 16 20	2349	103 1 8	2335	104 46 17	2321	106 31 46	2307
	Pollux	W.	70 23 54	2413	72 7 10	2398	73 50 47	2384	75 34 45	2370
	Regulus	W.	34 30 10	2414	36 13 25	2397	37 57 4	2382	39 41 5	2366
	SUN	E.	82 9 43	2722	80 33 32	2706	78 57 0	2691	77 20 8	2676
17	Pollux	W.	84 19 47	2298	86 5 50	2284	87 52 13	2270	89 38 56	2257
	Regulus	W.	48 26 44	2291	50 12 57	2276	51 59 32	2262	53 46 27	2248
	Mars	W.	21 39 11	2443	23 21 44	2425	25 4 43	2407	26 48 8	2390
	SUN	E.	69 10 39	2599	67 31 43	2585	65 52 28	2570	64 12 52	2556
18	Pollux	W.	98 37 20	2194	100 25 56	2183	102 14 49	2172	104 3 59	2161



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XVh.	P.L. of diff.	XVIIIh.	P.L. of diff.	XXIh.	P.L. of diff.
9	Regulus E.	49 26 2	2950	47 54 46	2945	46 23 24	2939	44 51 54	2933
	Mars E.	72 56 25	3106	71 28 23	3099	70 0 12	3093	68 31 54	3086
	Spica E.	102 25 3	2972	101 54 15	2965	100 23 18	2959	98 52 14	2951
10	α Arietis W.	75 1 23	3036	76 30 51	3026	78 0 31	3018	79 30 21	3010
	Aldebaran W.	43 15 57	2892	44 48 26	2884	46 21 6	2876	47 53 56	2868
	Jupiter W.	29 7 40	2838	30 41 18	2830	32 15 7	2823	33 49 5	2815
	Regulus E.	37 12 36	2904	35 40 22	2899	34 8 2	2893	32 35 34	2888
	Mars E.	61 8 13	3049	59 39 1	3043	58 9 41	3035	56 40 11	3026
	Spica E.	91 14 38	2916	89 42 40	2909	88 10 32	2901	86 38 15	2894
11	Aldebaran W.	55 40 45	2825	57 14 40	2816	58 48 47	2807	60 23 6	2798
	Jupiter W.	41 41 34	2774	43 16 36	2765	44 51 50	2756	46 27 16	2747
	Regulus E.	24 51 40	2866	23 18 38	2864	21 45 33	2864	20 12 28	2864
	Mars E.	49 10 10	2985	47 39 38	2976	46 8 55	2968	44 38 2	2958
	Spica E.	78 54 21	2855	77 21 4	2846	75 47 35	2838	74 13 56	2829
12	Aldebaran W.	68 17 45	2748	69 53 21	2739	71 29 9	2728	73 5 12	2717
	Jupiter W.	54 27 29	2699	56 4 10	2689	57 41 5	2678	59 18 14	2668
	Pollux W.	24 33 33	2860	26 6 43	2837	27 40 23	2816	29 14 30	2797
	Mars E.	37 0 39	2912	35 28 35	2902	33 56 18	2892	32 23 49	2883
	Spica E.	66 22 53	2785	64 48 6	2776	63 13 6	2767	61 37 55	2757
	Sun E.	124 56 37	3106	123 28 35	3096	122 0 20	3084	120 31 51	3072
13	Aldebaran W.	81 9 4	2661	82 46 37	2649	84 24 25	2637	86 2 30	2625
	Jupiter W.	67 27 37	2612	69 6 16	2601	70 45 10	2588	72 24 21	2577
	Pollux W.	37 11 2	2711	38 47 27	2696	40 24 12	2681	42 1 18	2666
	Mars E.	24 38 22	2836	23 4 41	2828	21 30 50	2821	19 56 50	2815
	Spica E.	53 38 52	2711	52 2 27	2701	50 25 48	2692	48 48 58	2683
	Sun E.	113 5 44	3010	111 35 44	2997	110 5 28	2985	108 34 56	2972
14	Aldebaran W.	94 17 8	2561	95 56 56	2548	97 37 3	2535	99 17 28	2521
	Jupiter W.	80 44 28	2513	82 25 23	2500	84 6 36	2487	85 48 7	2474
	Pollux W.	50 11 51	2591	51 50 59	2577	53 30 26	2561	55 10 14	2547
	Spica E.	40 41 46	2641	39 3 47	2635	37 25 39	2628	35 47 22	2623
	Sun E.	100 58 1	2902	99 25 44	2888	97 53 10	2873	96 20 17	2858
15	Jupiter W.	94 20 30	2405	96 3 57	2391	97 47 44	2377	99 31 52	2363
	Pollux W.	63 34 22	2473	65 16 13	2458	66 58 26	2443	68 41 0	2429
	Regulus W.	27 41 9	2482	29 22 47	2464	31 4 51	2447	32 47 19	2431
	Spica E.	27 34 52	2622	25 56 27	2631	24 18 15	2646	22 40 22	2666
	Sun E.	88 31 3	2783	86 56 13	2768	85 21 3	2753	83 45 33	2738
16	Jupiter W.	108 17 36	2293	110 3 46	2279	111 50 17	2265	113 37 8	2251
	Pollux W.	77 19 3	2355	79 3 43	2340	80 48 44	2326	82 34 5	2312
	Regulus W.	41 25 29	2350	43 10 15	2335	44 55 23	2320	46 40 53	2306
	Sun E.	75 42 56	2660	74 5 22	2645	72 27 28	2630	70 49 14	2615
17	Pollux W.	91 25 58	2243	93 13 21	2231	95 1 2	2218	96 49 2	2206
	Regulus W.	55 33 43	2235	57 21 19	2221	59 9 15	2208	60 57 31	2195
	Mars W.	28 31 57	2373	30 16 10	2358	32 0 45	2343	33 45 42	2328
	Sun E.	62 32 57	2541	60 52 41	2528	59 12 7	2514	57 31 13	2501
18	Pollux W.	105 53 26	2151	107 43 7	2141	109 33 4	2132	111 23 14	2123



MEAN TIME.									
LUNAR DISTANCES.									
Day of the Month.	Star's Name and Position.	Noon.	P.L. of diff.	III <sup>h</sup> .	P.L. of diff.	VI <sup>h</sup> .	P.L. of diff.	IX <sup>h</sup> .	P.L. of diff.
18	Regulus W.	62° 46' 6"	2183	64° 34' 59"	2171	66° 24' 10"	2159	68° 13' 40"	2148
	Mars W.	35° 31' 0"	2315	37° 16' 38"	2302	39° 2' 35"	2288	40° 48' 52"	2276
	SUN E.	55° 50' 1"	2488	54° 8' 31"	2475	52° 26' 43"	2463	50° 44' 38"	2451
19	Regulus W.	77° 25' 9"	2098	79° 16' 11"	2090	81° 7' 26"	2082	82° 58' 52"	2074
	Mars W.	49° 44' 35"	2222	51° 32' 30"	2213	53° 20' 39"	2204	55° 9' 0"	2196
	Spica W.	24° 14' 50"	2289	26° 1' 6"	2255	27° 48' 12"	2228	29° 35' 58"	2204
	SUN E.	42° 10' 14"	2399	40° 26' 38"	2390	38° 42' 49"	2382	36° 58' 49"	2374
24	SUN W.	26° 59' 54"	2586	28° 39' 8"	2603	30° 17' 59"	2621	31° 56' 26"	2639
	α Pegasi E.	55° 25' 18"	2908	53° 53' 9"	2954	52° 21' 59"	3005	50° 51' 52"	3058
	α Arietis E.	96° 34' 55"	2409	94° 51' 33"	2425	93° 8' 34"	2441	91° 25' 57"	2458
25	SUN W.	40° 2' 22"	2734	41° 38' 16"	2754	43° 13' 44"	2774	44° 48' 46"	2794
	α Pegasi E.	43° 39' 20"	3399	42° 17' 2"	3486	40° 56' 22"	3582	39° 37' 28"	3686
	α Arietis E.	82° 59' 5"	2549	81° 19' 0"	2569	79° 39' 23"	2589	78° 0' 13"	2610
	Aldebaran E.	114° 1' 7"	2407	112° 17' 43"	2425	110° 34' 44"	2444	108° 52' 12"	2463
26	SUN W.	52° 37' 24"	2894	54° 9' 50"	2914	55° 41' 51"	2935	57° 13' 26"	2954
	α Aquilæ W.	42° 11' 21"	4414	43° 16' 30"	4317	44° 23' 7"	4233	45° 31' 2"	4159
	α Arietis E.	69° 51' 31"	2717	68° 15' 14"	2739	66° 39' 26"	2763	65° 4' 9"	2785
	Aldebaran E.	100° 26' 1"	2555	98° 46' 4"	2574	97° 6' 33"	2592	95° 27' 27"	2610
	Jupiter E.	112° 28' 14"	2511	110° 47' 16"	2529	109° 6' 43"	2548	107° 26' 36"	2566
27	SUN W.	64° 45' 11"	3051	66° 14' 20"	3070	67° 43' 7"	3089	69° 11' 30"	3106
	α Aquilæ W.	51° 25' 52"	3903	52° 39' 9"	3868	53° 53' 1"	3839	55° 7' 23"	3813
	α Arietis E.	57° 15' 25"	2906	55° 43' 14"	2932	54° 11' 36"	2958	52° 40' 31"	2985
	Aldebaran E.	87° 18' 7"	2700	85° 41' 27"	2717	84° 5' 10"	2734	82° 29' 15"	2751
	Jupiter E.	99° 12' 11"	2654	97° 34' 30"	2672	95° 57' 13"	2688	94° 20' 17"	2705
28	SUN W.	76° 28' 8"	3193	77° 54' 26"	3208	79° 20' 26"	3224	80° 46' 7"	3239
	α Aquilæ W.	61° 24' 55"	3727	62° 41' 14"	3716	63° 57' 44"	3707	65° 14' 24"	3700
	α Arietis E.	45° 13' 42"	3131	43° 46' 10"	3163	42° 19' 17"	3198	40° 53' 6"	3234
	Aldebaran E.	74° 35' 5"	2830	73° 1' 16"	2845	71° 27' 47"	2859	69° 54' 36"	2873
	Jupiter E.	86° 21' 4"	2784	84° 46' 15"	2798	83° 11' 45"	2813	81° 37' 34"	2826
29	SUN W.	87° 50' 13"	3308	89° 14' 15"	3321	90° 38' 2"	3332	92° 1' 36"	3345
	α Aquilæ W.	71° 39' 8"	3682	72° 56' 14"	3681	74° 13' 22"	3681	75° 30' 29"	3682
	Fomalhaut W.	36° 3' 54"	3518	37° 23' 58"	3490	38° 44' 33"	3466	40° 5' 35"	3446
	Aldebaran E.	62° 13' 1"	2938	60° 41' 30"	2950	59° 10' 14"	2961	57° 39' 12"	2971
	Jupiter E.	73° 50' 57"	2890	72° 18' 25"	2902	70° 46' 9"	2913	69° 14' 6"	2923
30	SUN W.	98° 56' 16"	3394	100° 18' 39"	3403	101° 40' 52"	3411	103° 2' 56"	3418
	Fomalhaut W.	46° 55' 38"	3377	48° 18' 21"	3368	49° 41' 14"	3360	51° 4' 16"	3353
	α Pegasi W.	35° 29' 58"	4492	36° 33' 57"	4397	37° 39' 21"	4312	38° 46' 2"	4237
	Aldebaran E.	50° 7' 13"	3018	48° 37' 23"	3027	47° 7' 44"	3035	45° 38' 14"	3042
	Jupiter E.	61° 37' 1"	2969	60° 6' 9"	2977	58° 35' 28"	2985	57° 4' 56"	2991
31	SUN W.	109° 51' 22"	3448	111° 12' 45"	3453	112° 34' 2"	3456	113° 55' 15"	3460
	Fomalhaut W.	58° 1' 13"	3327	59° 24' 53"	3324	60° 48' 37"	3319	62° 12' 27"	3316
	α Pegasi W.	44° 34' 59"	3961	45° 47' 17"	3921	47° 0' 15"	3884	48° 13' 51"	3850
	Aldebaran E.	38° 12' 49"	3073	36° 44' 6"	3078	35° 15' 29"	3082	33° 46' 57"	3086
	Jupiter E.	49° 34' 12"	3019	48° 4' 23"	3023	46° 34' 39"	3027	45° 5' 0"	3030
	Pollux E.	82° 29' 53"	3081	81° 1' 20"	3085	79° 32' 52"	3089	78° 4' 29"	3092



## MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P.L. of diff.	XV <sup>h</sup> .	P.L. of diff.	XVIII <sup>h</sup> .	P.L. of diff.	XXI <sup>h</sup> .	P.L. of diff.
18	Regulus W.	70 3 26	2137	71 53 28	2126	73 43 47	2116	75 34 21	2107
	Mars W.	42 35 27	2264	44 22 20	2253	46 9 29	2242	47 56 54	2231
	Sun E.	49 2 16	2440	47 19 38	2429	45 36 45	2418	43 53 36	2409
19	Regulus W.	84 50 31	2068	86 42 19	2062	88 34 17	2057	90 26 23	2051
	Mars W.	56 57 34	2189	58 46 18	2182	60 35 13	2176	62 24 16	2170
	Spica W.	31 24 20	2183	33 13 13	2165	35 2 33	2150	36 52 16	2137
	Sun E.	35 14 37	2368	33 30 16	2361	31 45 45	2355	30 1 6	2350
24	Sun W.	33 34 28	2658	35 12 4	2677	36 49 15	2695	38 26 2	2715
	α Pegasi E.	49 22 51	3115	47 55 0	3178	46 28 25	3246	45 3 10	3319
	α Arietis E.	89 43 45	2475	88 1 57	2493	86 20 33	2512	84 39 36	2530
25	Sun W.	46 23 22	2814	47 57 31	2834	49 31 15	2854	51 4 33	2875
	α Pegasi E.	38 20 26	3802	37 5 26	3930	35 52 37	4074	34 42 10	4234
	α Arietis E.	76 21 31	2631	74 43 18	2652	73 5 33	2673	71 28 17	2695
	Aldebaran E.	107 10 6	2481	105 28 26	2499	103 47 11	2518	102 6 23	2537
26	Sun W.	58 44 36	2974	60 15 21	2994	61 45 41	3013	63 15 38	3032
	α Aquilæ W.	46 40 7	4093	47 50 16	4036	49 1 20	3985	50 13 14	3941
	α Arietis E.	63 29 22	2809	61 55 6	2833	60 21 21	2857	58 48 7	2882
	Aldebaran E.	93 48 46	2629	92 10 30	2647	90 32 39	2664	88 55 11	2682
	Jupiter E.	105 46 54	2584	104 7 37	2602	102 28 44	2620	100 50 16	2637
27	Sun W.	70 39 32	3124	72 7 12	3142	73 34 31	3158	75 1 30	3176
	α Aquilæ W.	56 22 12	3790	57 37 25	3770	58 52 58	3753	60 8 49	3739
	α Arietis E.	51 19 0	3012	49 40 2	3040	48 10 39	3069	46 41 52	3100
	Aldebaran E.	80 53 43	2767	79 18 32	2784	77 43 43	2799	76 9 14	2814
	Jupiter E.	92 43 44	2722	91 7 33	2738	89 31 43	2753	87 56 14	2768
28	Sun W.	82 11 30	3254	83 36 35	3268	85 1 24	3282	86 25 57	3296
	α Aquilæ W.	66 31 11	3694	67 48 4	3690	69 5 2	3686	70 22 4	3684
	α Arietis E.	39 27 37	3272	38 2 53	3314	36 38 58	3358	35 15 53	3406
	Aldebaran E.	68 21 43	2887	66 49 7	2901	65 16 49	2913	63 44 47	2926
	Jupiter E.	80 3 40	2840	78 30 4	2854	76 56 46	2866	75 23 43	2879
29	Sun W.	93 24 56	3356	94 48 3	3365	96 10 59	3376	97 33 43	3386
	α Aquilæ W.	76 47 35	3583	78 4 40	3585	79 21 43	3587	80 38 44	3590
	Fomalhaut W.	41 27 0	3428	42 48 45	3412	44 10 48	3399	45 33 6	3387
	Aldebaran E.	56 8 23	2982	54 37 48	2992	53 7 25	3001	51 37 13	3010
	Jupiter E.	67 42 16	2934	66 10 40	2943	64 39 15	2952	63 8 2	2961
30	Sun W.	104 24 52	3425	105 46 40	3432	107 8 20	3438	108 29 54	3443
	Fomalhaut W.	52 27 27	3347	53 50 44	3341	55 14 8	3336	56 37 38	3331
	α Pegasi W.	39 53 53	4170	41 2 48	4110	42 12 40	4056	43 23 25	4006
	Aldebaran E.	44 8 53	3049	42 39 41	3055	41 10 36	3061	39 41 39	3067
	Jupiter E.	55 34 32	2998	54 4 16	3004	52 34 8	3009	51 4 7	3014
31	Sun W.	115 16 24	3463	116 37 30	3465	117 58 33	3467	119 19 34	3469
	Fomalhaut W.	63 36 20	3312	65 0 17	3308	66 24 19	3306	67 48 24	3302
	α Pegasi W.	49 28 2	3819	50 42 44	3790	51 57 57	3764	53 13 37	3739
	Aldebaran E.	32 18 30	3090	30 50 8	3094	29 21 51	3098	27 53 39	3101
	Jupiter E.	43 35 25	3033	42 5 53	3036	40 36 25	3038	39 6 59	3039
	Pollux E.	76 36 10	3095	75 7 55	3097	73 39 42	3100	72 11 33	3101



Day of the Month.	AIRY's Day Numbers— For correcting the Places of the Fixed Stars.					Mean Time of Transit of the First Point of Aries.
	At Mean Midnight,					
	Logarithms of				Value of L	
	E	F	G	H		
1	1°49858	1°64513	0°24675	1°43449	42°412	<sup>h</sup> 7 <sup>m</sup> 18 <sup>s</sup> 14·26
2	1°49425	1°64634	0°24757	1°43455	42°552	7 14 18·35
3	1°48986	1°64748	0°24840	1°43461	42°701	7 10 22·44
4	1°48539	1°64856	0°24924	1°43465	42°859	7 6 26·53
5	1°48084	1°64958	0°25008	1°43469	43°026	7 2 30·62
6	1°47622	1°65054	0°25092	1°43472	43°204	6 58 34·70
7	1°47154	1°65143	0°25176	1°43474	43°391	6 54 38·79
8	1°46678	1°65227	0°25260	1°43475	43°587	6 50 42·88
9	1°46194	1°65304	0°25344	1°43475	43°794	6 46 46·97
10	1°45703	1°65375	0°25429	1°43474	44°011	6 42 51·06
11	1°45204	1°65440	0°25514	1°43472	44°236	6 38 55·15
12	1°44697	1°65499	0°25600	1°43469	44°470	6 34 59·23
13	1°44184	1°65551	0°25685	1°43464	44°714	6 31 3·32
14	1°43662	1°65597	0°25770	1°43459	44°968	6 27 7·41
15	1°43133	1°65638	0°25855	1°43453	45°231	6 23 11·50
16	1°42596	1°65671	0°25940	1°43445	45°504	6 19 15·59
17	1°42051	1°65699	0°26025	1°43437	45°785	6 15 19·68
18	1°41499	1°65721	0°26110	1°43428	46°074	6 11 23·76
19	1°40940	1°65736	0°26195	1°43418	46°373	6 7 27·85
20	1°40372	1°65746	0°26280	1°43406	46°680	6 3 31·94
21	1°39796	1°65749	0°26365	1°43392	46°997	5 59 36·02
22	1°39212	1°65746	0°26450	1°43377	47°323	5 55 40·11
23	1°38621	1°65736	0°26535	1°43362	47°657	5 51 44·20
24	1°38022	1°65721	0°26619	1°43347	47°999	5 47 48·29
25	1°37416	1°65699	0°26703	1°43330	48°348	5 43 52·38
26	1°36801	1°65671	0°26787	1°43311	48°707	5 39 56·47
27	1°36178	1°65638	0°26871	1°43291	49°073	5 36 0·55
28	1°35547	1°65597	0°26954	1°43270	49°448	5 32 4·64
29	1°34909	1°65551	0°27037	1°43248	49°830	5 28 8·73
30	1°34264	1°65498	0°27119	1°43226	50°220	5 24 12·82
31	1°33610	1°65439	0°27200	1°43203	50°618	5 20 16·91
32	1°32948	1°65373	0°27281	1°43179	51°025	5 16 21·00



Day of the Month.	BESSEL's Day Numbers— For correcting the Places of the Fixed Stars.				Days elapsed of the Julian Period at Mean Noon.	Mean Equinoctial Time, adding 0 <sup>d</sup> .783249.	From Mean Noon of January 1.	
	At Mean Midnight,						Days.	Day of the Year.
	Logarithms of							
	A	B	C	D				
1	+0.8142	+1.2826	+9.7521	+0.3414	2404398	253	334	.9145
2	0.7929	1.2854	9.7546	0.3422	2404399	254	335	.9172
3	0.7703	1.2880	9.7572	0.3429	2404400	255	336	.9199
4	+0.7464	+1.2905	+9.7598	+0.3435	2404401	256	337	.9227
5	0.7209	1.2928	9.7624	0.3440	2404402	257	338	.9254
6	0.6936	1.2950	9.7649	0.3443	2404403	258	339	.9282
7	+0.6643	+1.2970	+9.7675	+0.3446	2404404	259	340	.9309
8	0.6328	1.2989	9.7701	0.3447	2404405	260	341	.9336
9	0.5987	1.3006	9.7727	0.3447	2404406	261	342	.9364
10	+0.5615	+1.3022	+9.7752	+0.3445	2404407	262	343	.9391
11	0.5207	1.3037	9.7778	0.3443	2404408	263	344	.9418
12	0.4754	1.3050	9.7803	0.3439	2404409	264	345	.9446
13	+0.4247	+1.3062	+9.7829	+0.3434	2404410	265	346	.9473
14	0.3672	1.3072	9.7854	0.3427	2404411	266	347	.9501
15	0.3006	1.3081	9.7879	0.3420	2404412	267	348	.9528
16	+0.2218	+1.3089	+9.7904	+0.3411	2404413	268	349	.9555
17	0.1252	1.3095	9.7929	0.3400	2404414	269	350	.9583
18	0.0006	1.3100	9.7954	0.3388	2404415	270	351	.9610
19	+9.8248	+1.3103	+9.7979	+0.3375	2404416	271	352	.9637
20	9.5247	1.3105	9.8004	0.3360	2404417	272	353	.9665
21	+7.0379	1.3106	9.8028	0.3344	2404418	273	354	.9692
22	-9.5218	+1.3105	+9.8053	+0.3326	2404419	274	355	.9720
23	9.8235	1.3103	9.8077	0.3307	2404420	275	356	.9747
24	9.9998	1.3100	9.8101	0.3286	2404421	276	357	.9774
25	-0.1247	+1.3095	+9.8125	+0.3264	2404422	277	358	.9802
26	0.2214	1.3089	9.8149	0.3240	2404423	278	359	.9829
27	0.3004	1.3081	9.8173	0.3215	2404424	279	360	.9856
28	-0.3671	+1.3072	+9.8196	+0.3188	2404425	280	361	.9884
29	0.4248	1.3062	9.8220	0.3159	2404426	281	362	.9911
30	0.4756	1.3050	9.8243	0.3129	2404427	282	363	.9939
31	0.5209	1.3037	9.8266	0.3098	2404428	283	364	.9966
32	-0.5618	+1.3022	+9.8289	+0.3064	2404429	284	365	.9993

\* Add .0026 if Fraction be required for the time t, see page 329.

\* Add .0026 if Fraction be required for the time  $t$ , see page 329.



Mean Noon.	Apparent Obliquity.	The Sun's		Precession in Longitude.	Equation of Equinoxes.		Mean Longitude of C's Ascending Node.
		Horizontal Parallax.	Aberration.		In Long.	In R. A. (in time)	
	<sup>°</sup> 23 27						<sup>°</sup> 119 20.7
1870.							
Jan. 1	17° 33	9° 10	-20° 79	0° 00	-14° 74	-0° 90	119 20.7
11	17° 50	9° 10	-20° 79	1° 38	14° 44	0° 88	118 48.9
21	17° 70	9° 09	-20° 77	2° 75	14° 24	0° 87	118 17.1
31	17° 96	9° 08	-20° 74	4° 13	14° 18	0° 87	117 45.3
Feb. 10	18° 23	9° 07	-20° 71	5° 50	14° 27	0° 87	117 13.6
20	18° 45	9° 05	-20° 67	6° 88	14° 52	0° 89	116 41.8
Mar. 2	18° 65	9° 02	-20° 62	8° 26	14° 89	0° 91	116 10.0
12	18° 81	9° 00	-20° 56	9° 63	15° 35	0° 94	115 38.3
22	18° 89	8° 98	-20° 50	11° 01	15° 85	0° 97	115 6.5
Apr. 1	18° 90	8° 95	-20° 45	12° 38	16° 33	1° 00	114 34.7
11	18° 88	8° 92	-20° 39	13° 76	16° 77	1° 03	114 2.9
21	18° 79	8° 90	-20° 33	15° 13	17° 09	1° 05	113 31.2
May 1	18° 68	8° 88	-20° 28	16° 51	17° 29	1° 06	112 59.4
11	18° 55	8° 86	-20° 23	17° 89	17° 33	1° 06	112 27.6
21	18° 46	8° 84	-20° 19	19° 26	17° 24	1° 05	111 55.9
31	18° 39	8° 82	-20° 16	20° 64	17° 03	1° 04	111 24.1
June 10	18° 36	8° 81	-20° 13	22° 01	16° 72	1° 02	110 52.3
20	18° 39	8° 81	-20° 12	23° 39	16° 36	1° 00	110 20.5
30	18° 48	8° 80	-20° 11	24° 77	16° 00	0° 98	109 48.8
July 10	18° 64	8° 80	-20° 11	26° 14	15° 67	0° 96	109 17.0
20	18° 84	8° 81	-20° 12	27° 52	15° 43	0° 94	108 45.2
30	19° 07	8° 82	-20° 14	28° 89	15° 28	0° 93	108 13.4
Aug. 9	19° 32	8° 83	-20° 17	30° 27	15° 28	0° 93	107 41.7
19	19° 56	8° 85	-20° 21	31° 65	15° 42	0° 94	107 9.9
29	19° 78	8° 87	-20° 25	33° 02	15° 69	0° 96	106 38.1
Sept. 8	19° 97	8° 89	-20° 30	34° 40	16° 06	0° 98	106 6.3
18	20° 11	8° 91	-20° 36	35° 77	16° 51	1° 01	105 34.6
28	20° 17	8° 94	-20° 42	37° 15	16° 98	1° 04	105 2.8
Oct. 8	20° 18	8° 96	-20° 48	38° 53	17° 43	1° 07	104 31.0
18	20° 11	8° 99	-20° 53	39° 90	17° 80	1° 09	103 59.3
28	20° 03	9° 01	-20° 59	41° 28	18° 07	1° 10	103 27.5
Nov. 7	19° 90	9° 04	-20° 64	42° 65	18° 17	1° 11	102 55.7
17	19° 78	9° 06	-20° 69	44° 03	18° 13	1° 11	102 23.9
27	19° 71	9° 07	-20° 73	45° 40	17° 94	1° 10	101 52.2
Dec. 7	19° 66	9° 09	-20° 76	46° 78	17° 62	1° 08	101 20.4
17	19° 67	9° 10	-20° 78	48° 16	17° 23	1° 05	100 48.6
27	19° 74	9° 10	-20° 79	49° 53	16° 80	1° 03	100 16.8
37	19° 89	9° 10	-20° 79	50° 91	-16° 41	-1° 00	99 45.1

Mean Obliquity, Jan. 1, 1870 - - - - - <sup>°</sup> 23 27 22.31  
 Precession of the Equinoxes for the Year 1870 - - - - - 50° 25' 70  
 for 1 Day - - - - - 1376

Daily Motion.

-3° 18'



Month and Day at Mean Noon.	X, True Eq <sup>a</sup> of Date.	X' - X, Reduc. to M. Eq <sup>a</sup> of Jan. 1.	Y, True Eq <sup>a</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>a</sup> of Jan. 1.	Z, True Eq <sup>a</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>a</sup> of Jan. 1.
Jan. 1	+0°1867163	+690	-0°8856288	+215	-0°3842513	-161
2	°2038693	680	°8824434	224	°3828701	155
3	°2209585	669	°8789825	232	°3813694	150
4	°2379778	658	°8752469	240	°3797495	145
5	°2549219	647	°8712378	248	°3780109	140
6	°2717850	636	°8669564	256	°3761542	134
7	°2885621	625	°8624048	263	°3741799	128
8	°3052478	614	°8575849	270	°3720892	123
9	°3218370	603	°8524980	277	°3698823	117
10	°3383245	592	°8471466	284	°3675604	112
11	°3547057	581	°8415320	290	°3651244	107
12	°3709754	570	°8356569	296	°3625750	101
13	°3871290	559	°8295226	302	°3599131	96
14	°4031617	547	°8231320	307	°3571399	91
15	°4190688	536	°8164864	312	°3542560	86
16	°4348453	525	°8095890	317	°3512628	81
17	°4504872	514	°8024413	321	°3481611	76
18	°4659897	502	°7950460	325	°3449519	71
19	°4813482	491	°7874044	329	°3416362	66
20	°4965586	480	°7795199	333	°3382147	61
21	°5116166	469	°7713941	336	°3346890	56
22	°5265175	458	°7630293	339	°3310593	51
23	°5412565	447	°7544273	342	°3273270	46
24	°5558295	436	°7455904	344	°3234927	42
25	°5702318	425	°7365216	346	°3195581	38
26	°5844590	414	°7272227	348	°3155238	34
27	°5985058	403	°7176973	349	°3113913	30
28	°6123680	392	°7079483	350	°3071621	26
29	°6260406	381	°6979784	351	°3028371	22
30	°6395187	370	°6877913	352	°2984180	18
31	°6527986	360	°6773896	353	°2939059	14
Feb. 1	°6658752	349	°6667776	354	°2893026	10
2	°6787445	339	°6559588	353	°2846093	6
3	°6914032	329	°6449371	353	°2798279	- 2
4	°7038470	319	°6337162	352	°2749600	+ 1
5	°7160718	309	°6222996	352	°2700068	4
6	°7280745	299	°6106920	352	°2649705	8
7	°7398512	290	°5988963	352	°2598526	11
8	°7513990	280	°5869168	352	°2546549	14
9	°7627146	270	°5747576	351	°2493790	18
10	°7737947	261	°5624226	350	°2440267	21
11	°7846364	252	°5499161	349	°2385998	24
12	°7952364	242	°5372420	348	°2331002	27
13	°8055924	233	°5244043	346	°2275297	30
14	°8157016	224	°5114073	344	°2218899	33
15	°8255618	215	°4982548	342	°2161828	35
16	+0°8351696	+206	-0°4849506	+340	-0°2104099	+ 38



Month and Day at Mean Noon.	X, True Eq <sup>2</sup> of Date.	X' - X, Reduc. to M. Eq <sup>2</sup> of Jan. 1.	Y, True Eq <sup>2</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>2</sup> of Jan. 1.	Z, True Eq <sup>2</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>2</sup> of Jan. 1.
Feb. 16	+0.8351696	+206	-0.4849506	+340	-0.2104099	+ 38
17	.8445232	197	.4714989	338	.2045731	41
18	.8536200	189	.4579030	336	.1986736	43
19	.8624570	181	.4441673	334	.1927138	46
20	.8710324	173	.4302947	331	.1866946	48
21	.8793432	165	.4162897	328	.1806182	51
22	.8873866	157	.4021561	325	.1744861	54
23	.8951600	149	.3878980	322	.1683002	56
24	.9026608	142	.3735200	319	.1620625	58
25	.9098870	135	.3590265	316	.1557747	60
26	.9168358	128	.3444222	313	.1494388	63
27	.9235048	121	.3297121	310	.1430573	65
28	.9298920	114	.3149005	306	.1366314	67
March 1	.9359952	107	.2999925	302	.1301639	69
2	.9418130	100	.2849929	298	.1236563	71
3	.9473434	93	.2699064	295	.1171111	73
4	.9525852	86	.2547384	291	.1105302	75
5	.9575370	80	.2394929	287	.1039156	76
6	.9621976	74	.2241757	283	.0972698	78
7	.9665657	68	.2087913	279	.0905947	80
8	.9706407	62	.1933445	275	.0838924	82
9	.9744217	56	.1778405	271	.0771650	83
10	.9779082	50	.1622840	267	.0704149	85
11	.9810994	44	.1466800	263	.0636441	86
12	.9839955	39	.1310332	259	.0568545	88
13	.9865952	34	.1153486	255	.0500485	89
14	.9888990	29	.0996309	250	.0432283	90
15	.9909070	24	.0838845	246	.0363956	91
16	.9926187	19	.0681140	241	.0295525	92
17	.9940342	14	.0523239	237	.0227009	93
18	.9951540	9	.0365180	232	.0158427	94
19	.9959775	5	.0207005	228	.0089796	95
20	.9965045	+ 1	-0.0048763	223	-0.0021138	96
21	.9967352	- 3	+0.0109506	219	+0.0047528	96
22	.9966687	7	.0267756	214	.0116186	97
23	.9963055	11	.0425946	209	.0184816	98
24	.9956454	15	.0584029	203	.0253400	98
25	.9946882	18	.0741954	198	.0321914	99
26	.9934345	21	.0899672	193	.0390338	100
27	.9918840	24	.1057130	188	.0458650	101
28	.9900377	27	.1214282	182	.0526832	102
29	.9878965	30	.1371084	177	.0594859	103
30	.9854605	33	.1527489	171	.0662717	103
31	.9827307	36	.1683438	166	.0730378	104
April 1	.9797087	38	.1838882	161	.0797821	104
2	.9763949	40	.1993779	156	.0865027	105
3	+0.9727915	- 42	+0.2148081	+150	+0.0931975	+105



Month and Day at Mean Noon.	X, True Eq <sup>a</sup> of Date.	X' - X, Reduc. to M. Eq <sup>a</sup> of Jan. 1.	Y, True Eq <sup>a</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>a</sup> of Jan. 1.	Z, True Eq <sup>a</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>a</sup> of Jan. 1.
April 3	+0° 9727915	- 42	+0° 2148081	+150	+0° 0931975	+105
4	9688992	44	2301741	144	0998047	105
5	9647202	46	2454710	138	1065020	106
6	9602562	48	2606947	132	1131077	106
7	9555084	49	2758399	126	1196795	106
8	9504792	50	2909027	120	1262154	107
9	9451710	51	3058782	114	1327139	107
10	9395856	52	3207626	108	1391726	107
11	9337252	53	3355513	102	1455899	107
12	9275927	54	3502401	97	1519637	107
13	9211894	54	3648253	91	1582927	108
14	9145180	54	3793036	85	1645749	108
15	9075814	54	3936710	79	1708087	108
16	9003808	54	4079239	73	1769927	108
17	8929186	54	4220590	67	1831254	108
18	8851966	53	4360725	61	1892051	109
19	8772172	52	4499605	55	1952302	109
20	8689824	51	4637190	49	2011991	109
21	8604946	50	4773443	43	2071102	109
22	8517554	49	4908316	37	2129614	110
23	8427680	47	5041775	31	2187514	110
24	8335352	45	5173782	24	2244785	111
25	8240588	43	5304293	18	2301406	111
26	8143419	41	5433265	12	2357362	111
27	8043876	38	5560665	+ 6	2412635	112
28	7941990	35	5686460	0	2467212	112
29	7837790	32	5810598	- 6	2521072	113
30	7731310	29	5933056	12	2574204	113
May 1	762285	26	6053793	18	2626591	113
2	7511645	22	6172772	24	2678215	114
3	7398530	18	6289957	30	2729061	114
4	7283278	14	6405320	36	2779117	115
5	7165922	10	6518816	41	2828368	115
6	7046505	- 5	6630423	46	2876798	115
7	6925072	0	6740111	51	2924397	116
8	6801655	+ 5	6847843	56	2971148	116
9	6676295	10	6953593	61	3017039	116
10	6549033	15	7057339	66	3062058	117
11	6419913	21	7159057	70	3106197	117
12	6288974	27	7258719	75	3149441	117
13	6156246	33	7356311	79	3191783	118
14	6021771	39	7451806	83	3233213	119
15	5885583	45	7545178	87	3273720	119
16	5747718	51	7636410	91	3313296	120
17	5608218	58	7725474	95	3351934	120
18	5467113	65	7812350	99	3389621	121
19	+0° 5324445	+ 72	+0° 7897012	-102	+0° 3426345	+121



Month and Day at Mean Noon.	X, True Eq <sup>d</sup> of Date.	X' - X, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Y, True Eq <sup>d</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Z, True Eq <sup>d</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>d</sup> of Jan. 1.
May 19	+0° 5324445	+ 72	+0° 7897012	-102	+0° 3426345	+121
20	° 5180255	79	° 7979430	105	° 3462100	122
21	° 5034575	86	° 8059582	108	° 3496871	123
22	° 4887446	93	° 8137448	111	° 3530652	123
23	° 4738918	101	° 8213001	113	° 3563427	124
24	° 4589023	109	° 8286219	115	° 3595194	125
25	° 4437809	117	° 8357075	117	° 3625935	126
26	° 4285319	125	° 8425559	119	° 3655647	127
27	° 4131592	133	° 8491637	121	° 3684316	128
28	° 3976683	141	° 8555298	122	° 3711936	129
29	° 3820627	149	° 8616521	123	° 3738502	130
30	° 3663477	158	° 8675286	124	° 3764001	131
31	° 3505283	167	° 8731574	125	° 3788428	132
June 1	° 3346093	175	° 8785374	126	° 3811775	133
2	° 3185952	184	° 8836668	127	° 3834037	135
3	° 3024918	193	° 8885439	126	° 3855207	136
4	° 2863034	202	° 8931685	125	° 3875279	137
5	° 2700353	211	° 8975389	124	° 3894250	139
6	° 2536925	220	° 9016540	123	° 3912112	141
7	° 2372797	229	° 9055136	122	° 3928862	142
8	° 2208016	238	° 9091170	120	° 3944501	144
9	° 2042630	247	° 9124641	118	° 3959024	145
10	° 1876678	256	° 9155536	116	° 3972427	146
11	° 1710211	265	° 9183861	113	° 3984710	148
12	° 1543269	274	° 9209600	110	° 3995870	149
13	° 1375897	283	° 9232761	107	° 4005914	151
14	° 1208138	292	° 9253325	104	° 4014830	152
15	° 1040036	301	° 9271295	101	° 4022621	154
16	° 0871637	310	° 9286660	97	° 4029282	155
17	° 0702986	319	° 9299422	93	° 4034815	157
18	° 0534127	328	° 9309570	89	° 4039214	159
19	° 0365102	337	° 9317096	84	° 4042478	161
20	° 0195964	346	° 9322009	79	° 4044606	163
21	+0° 0026753	355	° 9324289	73	° 4045594	165
22	-0° 0142482	364	° 9323940	67	° 4045441	167
23	° 0311687	372	° 9320959	61	° 4044148	169
24	° 0480824	380	° 9315345	55	° 4041711	171
25	° 0649837	388	° 9307096	49	° 4038135	174
26	° 0818677	396	° 9296217	42	° 4033417	176
27	° 0987293	404	° 9282709	35	° 4027560	179
28	° 1155633	412	° 9266565	28	° 4020563	181
29	° 1323650	420	° 9247800	20	° 4012430	184
30	° 1491289	427	° 9226414	12	° 4003159	186
July 1	° 1658498	434	° 9202419	- 3	° 3992757	188
2	° 1825230	441	° 9175819	+ 6	° 3981224	191
3	° 1991431	448	° 9146629	15	° 3968568	193
4	-0° 2157055	+455	+0° 9114861	+ 24	+0° 3954791	+196



Month and Day at Mean Noon.		X, True Eq <sup>d</sup> of Date.	X' - X, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Y, True Eq <sup>d</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Z, True Eq <sup>d</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>d</sup> of Jan. 1.
July	4	-0° 2157055	+ 455	+0° 9114861	+ 24	+0° 3954791	+196
	5	2322051	461	9080523	33	3939806	198
	6	2486377	467	9043630	43	3923889	200
	7	2649988	473	9004194	53	3906777	203
	8	2812837	479	8962233	63	3888568	205
	9	2974884	485	8917760	73	3869267	208
	10	3136086	490	8870792	83	3848883	211
	11	3296406	495	8821339	94	3827419	213
	12	3455795	500	8769419	105	3804887	216
	13	3614212	504	8715042	116	3781290	218
	14	3771616	508	8658222	127	3756630	221
	15	3927965	512	8598972	138	3730923	224
	16	4083221	515	8537308	149	3704166	226
	17	4237339	518	8473246	161	3676367	229
	18	4390276	521	8406796	173	3647536	232
	19	4541992	524	8337974	185	3617674	235
	20	4692440	527	8266794	197	3586790	238
	21	4841580	529	8193276	209	3554893	241
	22	4989367	531	8117439	222	3521990	244
	23	5135755	533	8039293	235	3488086	247
	24	5280701	534	7958866	247	3453198	250
	25	5424163	535	7876177	260	3417326	253
	26	5566089	536	7791245	273	3380483	256
	27	5706443	536	7704097	286	3342681	259
	28	5845174	535	7614755	299	3303926	262
	29	5982241	535	7523251	312	3264232	265
	30	6117597	534	7429610	325	3223612	268
	31	6251209	533	7333860	338	3182073	271
Aug.	1	6383031	531	7236030	351	3139632	274
	2	6513028	529	7136156	365	3096300	277
	3	6641163	527	7034262	378	3052087	280
	4	6767402	524	6930381	391	3007013	283
	5	6891708	521	6824547	404	2961089	286
	6	7014050	518	6716788	417	2914329	289
	7	7134397	514	6607134	430	2866746	292
	8	7252715	510	6495621	443	2818356	295
	9	7368975	506	6382280	456	2769174	298
	10	7483145	502	6267140	469	2719211	301
	11	7595198	497	6150229	482	2668483	304
	12	7705100	491	6031580	495	2616999	307
	13	7812817	485	5911219	508	2564774	309
	14	7918326	478	5789178	520	25111819	311
	15	8021592	471	5665488	533	2458151	314
	16	8122586	464	5540177	545	2403781	316
	17	8221276	457	5413278	557	2348722	319
	18	8317632	450	5284826	569	2292990	321
	19	-0° 8411624	+ 442	+0° 5154851	+ 581	+0° 2236600	+324



Month and Day at Mean Noon.	X, True Eq <sup>d</sup> of Date.	X' - X, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Y, True Eq <sup>d</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Z, True Eq <sup>d</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>d</sup> of Jan. 1.
Aug. 19	-0° 8411624	+ 442	+0° 5154851	+ 581	+0° 2236600	+ 324
20	8503222	434	5023389	593	2179565	327
21	8592388	425	4890480	605	2121903	329
22	8679100	416	4756155	616	2063628	332
23	8763324	407	4620451	627	2004755	334
24	8845034	398	4483409	638	1945302	336
25	8924194	389	4345070	649	1885287	339
26	9000782	379	4205476	660	1824726	341
27	9074770	368	4064667	671	1763637	344
28	9146138	357	3922689	682	1702038	346
29	9214852	346	3779583	692	1639948	348
30	9280900	335	3635390	702	1577384	351
31	9344260	323	3490160	712	1514368	353
Sept. 1	9404910	311	3343931	722	1450918	355
2	9462840	299	3196754	732	1387053	357
3	9518032	287	3048663	742	1322793	359
4	9570472	274	2899710	751	1258156	361
5	9620149	261	2749935	760	1193164	363
6	9667049	248	2599380	769	1127834	365
7	9711157	235	2448087	778	1062185	367
8	9752467	222	2296096	787	0996233	368
9	9790962	208	2143449	795	0929997	370
10	9826632	194	1990183	803	0863495	371
11	9859463	180	1836344	810	0796744	373
12	9889440	166	1681967	817	0729761	374
13	9916560	152	1527094	824	0662565	375
14	9940807	137	1371770	830	0595173	376
15	9962169	122	1216034	836	0527603	377
16	9980632	107	1059934	842	0459877	377
17	0° 9996190	92	0903507	848	0392011	378
18	1° 0008837	76	0746802	854	0324025	379
19	0018555	60	0589866	859	0255937	380
20	0025342	44	0432743	864	0187769	380
21	0029184	28	0275481	869	0119542	381
22	0030078	+ 12	+0° 0118126	874	+0° 0051273	381
23	0028018	- 4	-0° 0039268	879	-0° 0017014	381
24	0023002	20	0196656	883	0085299	382
25	0015022	37	0353987	887	0153562	382
26	1° 0004079	54	0511214	891	0221782	381
27	0° 9990177	71	0668286	894	0289935	381
28	9973317	88	0825152	897	0358001	381
29	9953505	105	0981762	900	0425957	381
30	9930747	122	1138069	902	0493785	380
Oct. 1	9905057	139	1294026	904	0561459	380
2	9876439	157	1449583	906	0628961	379
3	9844907	175	1604694	908	0696270	378
4	-0° 9810470	- 192	-0° 1759316	+ 909	-0° 0763365	+ 377



Month and Day at Mean Noon.		X, True Eq <sup>d</sup> of Date.	X' - X, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Y, True Eq <sup>d</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Z, True Eq <sup>d</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>d</sup> of Jan. 1.
Oct.	4	-0° 9810470	- 192	-0° 1759316	+ 909	-0° 0763365	+ 377
	5	° 9773134	210	° 1913403	910	° 0830228	376
	6	° 9732917	228	° 2066916	911	° 0896840	375
	7	° 9689824	246	° 2219808	912	° 0963182	374
	8	° 9643869	264	° 2372040	913	° 1029235	373
	9	° 9595064	282	° 2523569	914	° 1094983	371
	10	° 9543420	300	° 2674348	914	° 1160403	369
	11	° 9488944	318	° 2824342	913	° 1225482	367
	12	° 9431650	337	° 2973505	912	° 1290199	365
	13	° 9371552	356	° 3121792	911	° 1354533	363
	14	° 9308660	375	° 3269159	909	° 1418469	361
	15	° 9242992	393	° 3415567	907	° 1481987	359
	16	° 9174562	412	° 3560967	905	° 1545069	357
	17	° 9103382	431	° 3705313	903	° 1607694	355
	18	° 9029468	450	° 3848559	901	° 1669840	352
	19	° 8952840	468	° 3990664	898	° 1731493	349
	20	° 8873514	487	° 4131583	895	° 1792632	346
	21	° 8791510	506	° 4271268	892	° 1853234	343
	22	° 8706848	525	° 4409670	889	° 1913284	340
	23	° 8619548	544	° 4546746	885	° 1972758	337
	24	° 8529632	563	° 4682446	881	° 2031639	334
	25	° 8437130	582	° 4816731	876	° 2089905	330
	26	° 8342068	601	° 4949556	871	° 2147540	326
	27	° 8244480	620	° 5080871	866	° 2204521	322
	28	° 8144390	639	° 5210634	861	° 2260830	318
	29	° 8041839	658	° 5338804	855	° 2316450	314
	30	° 7936862	678	° 5465344	849	° 2371362	310
	31	° 7829487	697	° 5590213	843	° 2425548	305
Nov.	1	° 7719757	716	° 5713377	837	° 2478994	300
	2	° 7607697	735	° 5834800	830	° 2531684	295
	3	° 7493345	754	° 5954442	823	° 2583599	290
	4	° 7376730	773	° 6072275	815	° 2634727	285
	5	° 7257887	792	° 6188265	807	° 2685053	280
	6	° 7136855	811	° 6302375	799	° 2734563	275
	7	° 7013663	830	° 6414576	790	° 2783242	269
	8	° 6888342	849	° 6524827	781	° 2831075	264
	9	° 6760930	868	° 6633104	772	° 2878048	258
	10	° 6631465	887	° 6739371	762	° 2924149	253
	11	° 6499974	905	° 6843596	752	° 2969364	247
	12	° 6366504	923	° 6945741	742	° 3013678	241
	13	° 6231087	942	° 7045776	731	° 3057076	235
	14	° 6093754	960	° 7143668	720	° 3099545	229
	15	° 5954553	979	° 7239386	709	° 3141071	223
	16	° 5813518	998	° 7332895	698	° 3181640	216
	17	° 5670688	1017	° 7424164	686	° 3221238	209
	18	° 5526106	1035	° 7513165	674	° 3259851	202
	19	-0° 5379817	- 1053	-0° 7599857	+ 661	-0° 3297464	+ 195



Month and Day at Mean Noon.	X, True Eq <sup>d</sup> of Date.	X' - X, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Y, True Eq <sup>d</sup> of Date.	Y' - Y, Reduc. to M. Eq <sup>d</sup> of Jan. 1.	Z, True Eq <sup>d</sup> of Date.	Z' - Z, Reduc. to M. Eq <sup>d</sup> of Jan. 1.
Nov. 19	-0° 5379817	-1053	-0° 7599857	+661	-0° 3297464	+195
20	5231851	1071	7684217	648	3334066	188
21	5082258	1089	7766207	635	3369641	181
22	4931087	1106	7845803	621	3404175	173
23	4778384	1123	7922971	607	3437662	166
24	4624202	1140	7997686	592	3470086	158
25	4468585	1157	8069922	577	3501436	150
26	4311603	1174	8139654	562	3531701	142
27	4153299	1191	8206862	547	3560869	134
28	3993725	1208	8271520	531	3588932	126
29	3832934	1224	8333620	514	3615880	118
30	3670974	1240	8393141	497	3641710	110
Dec. 1	3507897	1256	8450064	479	3666412	101
2	3343752	1272	8504373	461	3689976	92
3	3178587	1287	8556057	442	3712401	84
4	3012451	1302	8605106	423	3733679	75
5	2845397	1317	8651497	404	3753802	66
6	2677467	1332	8695221	385	3772766	57
7	2508716	1346	8736265	366	3790569	48
8	2339191	1360	8774611	346	3807199	39
9	2168945	1373	8810251	325	3822658	30
10	1998025	1386	8843180	304	3836938	20
11	1826483	1399	8873374	283	3850034	+ 10
12	1654364	1412	8900824	262	3861940	0
13	1481730	1424	8925520	240	3872654	- 9
14	1308622	1436	8947462	218	3882170	19
15	1135094	1448	8966629	196	3890487	29
16	0961196	1459	8983016	173	3897595	39
17	0786982	1470	8996608	150	3903492	49
18	0612505	1480	9007403	126	3908176	59
19	0437822	1490	9015384	102	3911640	69
20	0262085	1500	9020550	78	3913886	79
21	-0° 0088057	1509	9022901	53	3914910	89
22	+0° 0086007	1518	9022426	28	3914708	99
23	0261843	1526	9019126	+ 3	3913288	109
24	0436691	1533	9013003	- 23	3910640	119
25	0611390	1540	9004059	49	3906767	130
26	0785886	1547	8992309	75	3901677	141
27	0960123	1554	8977751	101	3895368	152
28	1134044	1560	8960394	127	3887842	162
29	1307595	1565	8940246	154	3879100	173
30	1480725	1570	8917318	181	3869152	184
31	1653377	1574	8891624	208	3858002	195
32	+0° 1825509	-1578	-0° 8863163	-235	-0° 3845649	-206



**PLANETARY  
EPHEMERIDES  
AT  
MEAN NOON.**



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<div>h m s</div>	<div>South. ° ' "</div>	<div>°</div>	<div>h m</div>	<div>° ' "</div>	<div>South. ° ' "</div>	<div>9</div>
Jan. 1	19 36 13.56	23 47 17.5	.1220476	0 52.6	319 32 1.4	6 59 40.3	.6099534
2	19 43 12.50	23 29 55.7	.1175696	0 55.6	323 13 30.9	6 57 31.5	.6042634
3	19 50 8.71	23 11 0.7	.1127657	0 58.6	327 0 57.6	6 53 32.1	.5983420
4	19 57 1.59	22 50 33.1	.1076179	1 1.6	330 54 43.9	6 47 33.8	.5922024
5	20 3 50.51	22 28 34.9	.1021075	1 4.5	334 55 12.0	6 39 28.3	.5858622
6	20 10 34.73	22 5 8.0	.0962139	1 7.3	339 2 44.8	6 29 6.8	.5793418
7	20 17 13.42	21 40 15.1	.0899164	1 9.9	343 17 44.3	6 16 20.7	.5726662
8	20 23 45.65	21 13 59.9	.0831935	1 12.5	347 40 32.0	6 1 1.6	.5658663
9	20 30 10.34	20 46 26.8	.0760232	1 15.0	352 11 28.3	5 43 1.4	.5589780
10	20 36 26.29	20 17 41.5	.0683837	1 17.3	356 50 51.7	5 22 13.5	.5520435
11	20 42 32.17	19 47 50.1	.0602526	1 19.5	1 38 58.3	4 58 32.1	.5451117
12	20 48 26.41	19 17 1.2	.0516111	1 21.4	6 36 0.8	4 31 53.8	.5382392
13	20 54 7.31	18 45 24.1	.0424409	1 23.1	11 42 8.0	4 2 17.8	.5314897
14	20 59 32.93	18 13 10.4	.0327290	1 24.6	16 57 22.9	3 29 46.6	.5249342
15	21 4 41.15	17 40 32.8	.0224664	1 25.8	22 21 42.6	2 54 26.8	.5186499
16	21 9 29.58	17 7 47.0	.0116518	1 26.6	27 54 56.4	2 16 29.8	.5127191
17	21 13 55.69	16 35 10.1	.0002931	1 27.1	33 36 45.0	1 36 12.4	.5072284
18	21 17 56.69	16 3 1.2	.9884100	1 27.2	39 26 39.8	0 53 57.2	.5022665
19	21 21 29.71	15 31 42.5	.9760370	1 26.7	45 24 1.7	0 10 12.6	.4979185
20	21 24 31.75	15 1 36.7	.9632259	1 25.8	51 28 1.3	0 34 27.5	.4942667
21	21 26 59.81	14 33 8.7	.9500491	1 24.3	57 37 38.2	1 19 24.4	.4913840
22	21 28 51.03	14 6 44.3	.9366008	1 22.2	63 51 42.5	2 3 56.1	.4893305
23	21 30 2.75	13 42 49.5	.9229996	1 19.4	70 8 55.6	2 47 18.7	.4881507
24	21 30 32.79	13 21 49.0	.9093907	1 15.9	76 27 52.2	3 28 48.8	.4878715
25	21 30 19.57	13 4 6.6	.8959426	1 11.7	82 47 2.9	4 745.2	.4884986
26	21 29 22.37	12 50 1.9	.8828460	1 6.8	89 4 56.6	4 43 31.0	.4900186
27	21 27 41.47	12 39 50.7	.8703094	1 1.2	95 20 4.0	5 15 35.7	.4923973
28	21 25 18.41	12 33 43.0	.8585499	0 54.9	101 31 0.2	5 43 35.9	.4955838
29	21 22 16.09	12 31 41.2	.8477858	0 47.9	107 36 27.1	6 7 16.1	.4995125
30	21 18 38.76	12 33 41.1	.8382236	0 40.3	113 35 16.1	6 26 28.6	.5041065
Feb. 1	21 14 32.05	12 39 30.1	.8300453	0 32.3	119 26 29.0	6 41 13.3	.5092826
2	21 10 2.65	12 48 48.7	.8233981	0 23.9	125 9 19.0	6 51 36.3	.5149527
3	21 5 18.16	13 1 11.1	.8183831	0 15.3	130 43 11.2	6 57 49.2	.5210296
4	21 0 26.59	13 16 6.7	.8150496	{ 0.5.1}	136 74 1.4	7 0 7.3	.5274281
5	20 55 35.95	13 33 2.9	.8133934	23 49.2	141 22 35.9	6 58 48.9	.5340668
6	20 50 53.81	13 51 25.9	.8133586	23 40.9	146 27 50.3	6 54 13.7	.5408716
7	20 46 27.00	14 10 44.0	.8148470	23 32.9	151 23 27.5	6 46 42.1	.5477739
8	20 42 21.28	14 30 27.2	.8177260	23 25.3	156 9 37.5	6 36 34.5	.5547129
9	20 38 41.23	14 50 10.1	.8218406	23 18.2	160 46 35.2	6 24 10.3	.5616352
10	20 35 30.21	15 9 30.2	.8270240	23 11.6	165 14 39.5	6 9 48.0	.5684940
11	20 32 50.45	15 28 10.2	.8331074	23 5.6	169 34 12.2	5 53 44.7	.5752593



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Feb. 10							
	h m s	South.	9	h m	° ' "	North.	9
10	20 32 50.45	15 28 10.2	.8331074	23 5.6	169 34 12.2	5 53 44.7	.5752503
11	20 30 43.09	15 45 55.5	.8399281	23 0.1	173 45 37.2	5 36 16.0	.5818694
12	20 29 8.44	16 2 35.4	.8473342	22 55.1	177 49 19.7	5 17 36.1	.5883234
13	20 28 6.13	16 18 1.7	.8551885	22 50.6	181 45 45.3	4 57 57.4	.5945888
14	20 27 35.24	16 32 8.4	.8633695	22 46.6	185 35 20.0	4 37 31.1	.6006464
15	20 27 34.49	16 44 51.2	.8717731	22 43.1	189 18 29.4	4 16 27.0	.6064804
16	20 28 2.31	16 56 7.5	.8803102	22 40.1	192 55 38.8	3 54 53.7	.6120785
17	20 28 57.03	17 5 55.1	.8889068	22 37.5	196 27 12.8	3 32 58.7	.6174312
18	20 30 16.91	17 14 13.2	.8975017	22 35.2	199 53 35.0	3 10 48.3	.6225307
19	20 32 0.17	17 21 0.8	.9060458	22 33.3	203 15 8.2	2 48 28.4	.6273714
20	20 34 5.09	17 26 18.2	.9144992	22 31.8	206 32 14.3	2 26 3.5	.6319493
21	20 36 30.01	17 30 5.1	.9228316	22 30.5	209 45 14.5	2 3 38.0	.6362616
22	20 39 13.35	17 32 22.1	.9310188	22 29.6	212 54 28.6	1 41 15.5	.6403067
23	20 42 13.62	17 33 9.3	.9390429	22 28.9	216 0 15.7	1 18 59.0	.6440831
24	20 45 29.44	17 32 27.6	.9468911	22 28.4	219 2 54.1	0 56 51.2	.6475907
25	20 48 59.52	17 30 17.3	.9545548	22 28.2	222 2 41.4	0 34 54.5	.6508296
26	20 52 42.67	17 26 39.3	.9620281	22 28.2	224 59 54.0	0 13 10.8	.6538004
27	20 56 37.82	17 21 33.9	.9693078	22 28.3	227 54 48.2	0 8 18.0	.6565035
28	21 0 43.96	17 15 2.1	.9763926	22 28.6	230 47 39.2	0 29 30.4	.6589401
Mar. 1	21 5 0.18	17 7 4.4	.9832834	22 29.1	233 38 41.8	0 50 25.0	.6611112
2	21 9 25.67	16 57 41.5	.9899820	22 29.7	236 28 10.2	1 11 0.4	.6630174
3	21 13 59.67	16 46 54.2	.9964907	22 30.5	239 16 18.4	1 31 15.6	.6646602
0							
4	21 18 41.51	16 34 43.1	.0028135	22 31.3	242 3 19.7	1 51 9.5	.6660404
5	21 23 30.57	16 21 8.6	.0089538	22 32.3	244 49 27.3	2 10 40.8	.6671585
6	21 28 26.29	16 6 11.6	.0149159	22 33.4	247 34 53.8	2 29 48.7	.6680154
7	21 33 28.19	15 49 52.8	.0207043	22 34.6	250 19 51.9	2 48 32.1	.6686116
8	21 38 35.79	15 32 12.5	.0263232	22 35.8	253 4 33.9	3 6 49.8	.6689476
9	21 43 48.71	15 13 11.7	.0317775	22 37.2	255 49 12.3	3 24 40.9	.6690236
10	21 49 6.59	14 52 50.7	.0370715	22 38.6	258 33 59.2	3 42 4.2	.6688395
11	21 54 29.11	14 31 10.4	.0422093	22 40.1	261 19 6.8	3 58 58.3	.6683953
12	21 59 55.98	14 8 11.3	.0471951	22 41.7	264 4 47.3	4 15 22.0	.6676908
13	22 5 26.95	13 43 53.9	.0520326	22 43.3	266 51 13.1	4 31 13.8	.6667254
14	22 11 1.84	13 18 18.8	.0567251	22 45.0	269 38 36.7	4 46 32.1	.6654985
15	22 16 40.44	12 51 26.6	.0612761	22 46.8	272 27 10.5	5 1 15.2	.6640092
16	22 22 22.60	12 23 18.0	.0656880	22 48.6	275 17 7.7	5 15 21.2	.6622569
17	22 28 8.21	11 53 53.5	.0699635	22 50.5	278 8 41.4	5 28 47.9	.6602407
18	22 33 57.16	11 23 13.6	.0741044	22 52.4	281 2 5.0	5 41 33.0	.6579592
19	22 39 49.39	10 51 19.0	.0781121	22 54.4	283 57 32.5	5 53 34.0	.6554120
20	22 45 44.83	10 18 10.3	.0819870	22 56.4	286 55 18.2	6 4 48.1	.6525975
21	22 51 43.47	9 43 48.0	.0857305	22 58.5	289 55 37.0	6 15 12.0	.6495154
22	22 57 45.29	9 8 12.7	.0893415	23 0.7	292 58 44.2	6 24 42.4	.6461649



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	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South.</i> <i>° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>South.</i> <i>° ' "</i>	<i>9</i>
Mar. 22	22 57 45.29	9 8 12.7	0.893415	23 0.7	292 58 44.2	6 24 42.4	6.6461649
23	23 3 50.31	8 31 25.3	0.928197	23 2.9	296 4 55.7	6 33 15.4	6.6425455
24	23 9 58.55	7 53 26.3	0.961634	23 5.1	299 14 28.2	6 40 46.9	6.6386573
25	23 16 10.05	7 14 16.6	0.993710	23 7.4	302 27 38.8	6 47 12.4	6.6345010
26	23 22 24.89	6 33 56.8	1.024398	23 9.8	305 44 45.5	6 52 26.8	6.6300781
27	23 28 43.13	5 52 28.2	1.053658	23 12.2	309 6 6.9	6 56 24.7	6.6253907
28	23 35 4.89	5 9 51.5	1.081447	23 14.7	312 32 2.1	6 59 0.2	6.6204416
29	23 41 30.27	4 26 7.6	1.107721	23 17.2	316 2 51.5	7 0 6.9	6.6152363
30	23 47 59.41	3 41 18.0	1.132409	23 19.8	319 38 55.6	6 59 37.9	6.6097805
31	23 54 32.42	2 55 23.9	1.155439	23 22.5	323 20 35.7	6 57 25.8	6.6040832
Apr. 1	0 1 9.47	2 8 27.0	1.176733	23 25.3	327 8 13.8	6 53 22.8	6.5981544
2	0 7 50.70	1 20 28.8	1.196191	23 28.1	331 2 11.9	6 47 20.8	6.5920085
3	0 14 36.30	0 31 31.5	1.213707	23 31.0	335 2 53.0	6 39 11.2	6.5856622
		<i>North.</i>					
4	0 21 26.40	0 18 22.6	1.229157	23 33.9	339 10 39.3	6 28 45.4	6.5791364
5	0 28 21.17	1 9 10.8	1.242407	23 37.0	343 25 52.9	6 15 54.6	6.5724564
6	0 35 20.77	2 0 50.1	1.253309	23 40.1	347 48 55.4	6 0 30.6	6.5656531
7	0 42 25.33	2 53 16.7	1.261695	23 43.4	352 20 7.1	5 42 25.4	6.5587626
8	0 49 34.96	3 46 26.8	1.267387	23 46.7	356 59 46.6	5 21 32.1	6.5518272
9	0 56 49.75	4 40 15.3	1.270189	23 50.1	1 48 9.7	4 57 45.3	6.5448962
10	1 4 9.73	5 34 36.7	1.269899	23 53.6	6 45 29.1	4 31 1.5	6.5380266
11	1 11 34.91	6 29 25.0	1.266296	23 57.1	11 51 53.2	4 1 20.0	6.5312820
12	1 19 5.19	7 24 32.9	1.259158	* *	17 7 25.2	3 28 43.4	6.5247337
13	1 26 40.45	8 19 52.3	1.248249	0 0.8	22 32 1.7	2 53 18.5	6.5184590
14	1 34 20.47	9 15 14.5	1.233336	0 4.5	28 5 31.8	2 15 16.9	6.5125404
15	1 42 4.91	10 10 29.8	1.214199	0 8.3	33 47 36.1	1 34 55.4	6.5070648
16	1 49 53.35	11 5 27.2	1.190614	0 12.2	39 37 45.5	0 52 37.0	6.5021205
17	1 57 45.21	11 59 55.4	1.162385	0 16.1	45 35 20.7	0 8 50.1	6.4977929
		<i>North.</i>					
18	2 5 39.85	12 53 42.4	1.129339	0 20.1	51 39 31.8	0 35 51.1	6.4941639
19	2 13 36.45	13 46 35.5	1.091334	0 24.1	57 49 18.2	1 20 47.9	6.4913061
20	2 21 34.12	14 38 22.0	1.048275	0 28.2	64 3 29.7	2 5 18.1	6.4892792
21	2 29 31.85	15 28 49.2	1.000105	0 32.2	70 20 47.4	2 48 37.9	6.4881271
22	2 37 28.55	16 17 44.8	0.946815	0 36.2	76 39 45.9	3 30 3.9	6.4878762
23	2 45 23.05	17 4 57.2	0.888456	0 40.2	82 58 55.6	4 8 54.8	6.4885316
24	2 53 14.17	17 50 15.5	0.825121	0 44.1	89 16 45.6	4 44 34.2	6.4900791
25	3 1 0.67	18 33 30.4	0.756951	0 47.9	95 31 46.5	5 16 31.7	6.4924837
26	3 8 41.36	19 14 33.7	0.684135	0 51.7	101 42 33.6	5 44 24.0	6.4956945
27	3 16 15.06	19 53 18.4	0.606896	0 55.3	107 47 49.1	6 7 55.9	6.4996452
28	3 23 40.62	20 29 39.7	0.525483	0 58.8	113 46 24.8	6 27 0.1	6.5042587
29	3 30 56.97	21 3 33.7	0.440168	1 2.1	119 37 22.7	6 41 36.5	6.5094515
30	3 38 3.08	21 34 58.1	0.351244	1 5.3	125 19 56.5	6 51 51.6	6.5151356
May 1	3 44 58.00	22 3 51.8	0.259004	1 8.2	130 53 31.4	6 57 56.9	6.5212240



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Month and Day.	Geocentric.				Heliocentric.		
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	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div> <div>North.</div> <div>° ' "</div> <div>0</div> </div> <div> <div>h m s</div> <div>° ' "</div> <div>9</div> </div> </div>							
May 1	3 44 58.00	22 3 51.8	.0259004	1 8.2	130 53 31.4	6 57 56.9	.5212240
2	3 51 40.87	22 30 14.9	.0163743	1 11.0	136 17 43.8	7 0 8.1	.5276309
3	3 58 10.84	22 54 8.9	.0065762	1 13.6	141 32 20.3	6 58 43.2	.5342762
4	4 4 27.16	23 15 35.3	.9965358	1 15.9	146 37 16.6	6 54 2.3	.5410849
5	4 10 29.13	23 34 36.7	.9862814	1 18.0	151 32 36.0	6 46 25.6	.5479894
6	4 16 16.05	23 51 16.3	.9758416	1 19.8	156 18 28.6	6 36 13.4	.5549287
7	4 21 47.33	24 5 37.5	.9652440	1 21.4	160 55 9.4	6 23 45.2	.5618499
8	4 27 2.33	24 17 44.1	.9545163	1 22.7	165 22 57.5	6 9 19.5	.5687061
9	4 32 0.52	24 27 40.2	.9436853	1 23.7	169 42 14.7	5 53 13.4	.5754585
10	4 36 41.35	24 35 29.6	.9327786	1 24.4	173 53 25.0	5 35 42.3	.5820728
11	4 41 4.31	24 41 16.4	.9218235	1 24.8	177 56 53.6	5 17 0.3	.5885214
12	4 45 8.87	24 45 4.7	.9108481	1 24.9	181 53 6.1	4 57 20.0	.5947804
13	4 48 54.62	24 46 58.5	.8998816	1 24.7	185 42 28.4	4 36 52.4	.6008314
14	4 52 21.10	24 47 1.7	.8889538	1 24.2	189 25 26.4	4 15 47.3	.6066580
15	4 55 27.91	24 45 18.2	.8780965	1 23.3	193 2 25.0	3 54 13.2	.6122486
16	4 58 14.70	24 41 51.8	.8673424	1 22.1	196 33 48.9	3 32 17.6	.6175933
17	5 0 41.14	24 36 46.4	.8567268	1 20.6	200 0 1.8	3 10 6.9	.6226848
18	5 2 46.99	24 30 5.4	.8462868	1 18.8	203 21 26.4	2 47 46.7	.6275172
19	5 4 32.09	24 21 52.5	.8360621	1 16.6	206 38 24.7	2 25 21.8	.6320868
20	5 5 56.32	24 12 11.6	.8260935	1 14.0	209 51 17.6	2 2 56.3	.6363910
21	5 6 59.73	24 1 6.7	.8164262	1 11.1	213 0 25.0	1 40 33.9	.6404277
22	5 7 42.46	23 48 41.6	.8071067	1 7.9	216 6 6.0	1 18 17.7	.6441958
23	5 8 4.76	23 35 0.7	.7981833	1 4.3	219 8 38.9	0 56 10.2	.6476951
24	5 8 7.11	23 20 8.8	.7897066	1 0.4	222 8 21.0	0 34 13.8	.6509257
25	5 7 50.11	23 4 11.2	.7817283	0 56.2	225 5 29.3	0 12 30.6	.6538883
26	5 7 14.55	22 47 13.5	.7743016	0 51.7	228 0 19.4	0 8 57.7	.6565831
27	5 6 21.49	22 29 22.1	.7674778	0 46.8	230 53 6.9	0 30 9.6	.6590115
28	5 5 12.11	22 10 44.5	.7613087	0 41.7	233 44 6.4	0 51 3.6	.6611744
29	5 3 47.87	21 51 28.5	.7558438	0 36.4	236 33 32.1	1 11 38.4	.6630724
30	5 2 10.39	21 31 43.4	.7511274	0 30.9	239 21 38.2	1 31 53.0	.6647070
31	5 0 21.50	21 11 38.6	.7472012	0 25.1	242 8 37.7	1 51 46.1	.6660789
June 1	4 58 23.19	20 51 25.0	.7441006	0 19.2	244 54 43.9	2 11 16.8	.6671891
2	4 56 17.61	20 31 13.8	.7418540	0 13.2	247 40 9.4	2 30 23.9	.6680379
3	4 54 6.99	20 11 16.7	.7404818	0 7.1	250 25 6.9	2 49 6.5	.6686261
4	4 51 53.65	19 51 46.0	.7399967	{ 0 0 0 }	253 9 48.8	3 7 23.5	.6689539
5	4 49 39.93	19 32 54.1	.7404020	23 48.8	255 54 27.3	3 25 13.7	.6690220
6	4 47 28.13	19 14 52.9	.7416917	23 42.7	258 39 14.7	3 42 36.0	.6688298
7	4 45 20.50	18 57 53.9	.7438514	23 36.7	261 24 23.2	3 59 29.2	.6683777
8	4 43 19.22	18 42 8.0	.7468593	23 30.9	264 10 5.0	4 15 52.0	.6676651
9	4 41 26.29	18 27 45.4	.7506845	23 25.3	266 56 32.5	4 31 42.8	.6666918
10	4 39 43.58	18 14 54.5	.7552898	23 19.9	269 43 58.0	4 47 0.0	.6654568



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div>North.</div> <div>9</div> <div>South.</div> <div>9</div> </div>							
June 10	h m s 4 39 43.58	18 14 54.5	9 7552898	h m 23 19.9	° ' " 269 43 58.0	° ' " 4 47 0.0	9 6654568
11	4 38 12.74	18 3 42.9	7606338	23 14.6	272 32 34.4	5 1 42.0	6639595
12	4 36 55.27	17 54 16.6	7666694	23 9.6	275 22 34.4	5 15 46.8	6621989
13	4 35 52.45	17 46 40.0	7733470	23 4.9	278 14 11.3	5 29 12.3	6601746
14	4 35 5.34	17 40 56.3	7806153	23 0.5	281 7 38.7	5 41 56.0	6578849
15	4 34 34.83	17 37 6.9	7884218	22 56.3	284 3 10.3	5 53 55.6	6553297
16	4 34 21.67	17 35 11.9	7967143	22 52.5	287 1 0.5	6 5 8.2	6525070
17	4 34 26.37	17 35 10.4	8054419	22 48.9	290 1 24.4	6 15 30.5	6494166
18	4 34 49.37	17 37 0.1	8145551	22 45.7	293 4 37.1	6 24 59.1	6460580
19	4 35 31.01	17 40 37.9	8240062	22 42.7	296 10 54.7	6 33 30.3	6424301
20	4 36 31.43	17 45 59.4	8337503	22 40.1	299 20 33.7	6 40 59.9	6385338
21	4 37 50.79	17 53 0.1	8437444	22 37.7	302 33 51.4	6 47 23.3	6343693
22	4 39 29.12	18 1 34.2	8539487	22 35.7	305 51 5.7	6 52 35.4	6299383
23	4 41 26.42	18 11 35.6	8643259	22 34.1	309 12 35.3	6 56 30.8	6252427
24	4 43 42.71	18 22 57.9	8748409	22 32.7	312 38 39.4	6 59 3.7	6202857
25	4 46 17.89	18 35 33.8	8854611	22 31.6	316 9 38.8	7 0 7.5	6150727
26	4 49 11.93	18 49 15.9	8961560	22 30.9	319 45 52.4	6 59 35.4	6096095
27	4 52 24.75	19 3 56.8	9068966	22 30.4	323 27 43.2	6 57 20.0	6039049
28	4 55 56.28	19 19 28.3	9176559	22 30.3	327 15 32.7	6 53 13.5	5979693
29	4 59 46.47	19 35 42.0	9284077	22 30.5	331 9 43.1	6 47 7.6	5918170
30	5 3 55.27	19 52 29.2	9391271	22 31.0	335 10 36.8	6 38 54.0	5854649
July 1	5 8 22.61	20 9 41.2	9497894	22 31.8	339 18 36.6	6 28 23.8	5789341
2	5 13 8.46	20 27 8.4	9603706	22 32.9	343 34 4.3	6 15 28.5	5722497
3	5 18 12.75	20 44 41.3	9708468	22 34.3	347 57 21.6	5 59 59.6	5654435
4	5 23 35.43	21 2 9 8	9811940	22 36.0	352 28 48.7	5 41 49.2	5585508
5	5 29 16.42	21 19 23.4	9913871	22 38.1	357 8 43.9	5 20 50.7	5516152
6	5 35 15.61	21 36 11.4	0014010	22 40.4	1 57 23.3	4 56 58.5	5446853
7	5 41 32.81	21 52 22.6	0112098	22 43.0	6 54 59.3	4 30 9.2	5378185
8	5 48 7.80	22 7 45.5	0207871	22 46.0	12 1 40.2	4 0 22.3	5310791
9	5 55 0.25	22 22 7.9	0301051	22 49.2	17 17 29.0	3 27 40.4	5245381
10	6 2 9.74	22 35 18.0	0391355	22 52.7	22 42 22.0	2 52 10.5	5182730
11	6 9 35.71	22 47 3.6	0478502	22 56.4	28 16 8.2	2 14 4.3	5123670
12	6 17 17.44	22 57 12.6	0562201	23 0.4	33 58 27.8	1 33 38.9	5069065
13	6 25 14.08	23 5 33.0	0642171	23 4.7	39 48 51.4	0 51 17.3	5019797
14	6 33 24.59	23 11 53.6	0718139	23 9.1	45 46 39.4	0 7 28.2	4976729
15	6 41 47.77	23 16 3.8	0789850	23 13.7	51 51 1.5	0 37 14.0	4940665
16	6 50 22.23	23 17 54.1	0857069	23 18.5	58 0 57.1	1 22 10.7	4912335
17	6 59 6.43	23 17 16.1	0919604	23 23.5	64 15 15.3	2 6 39.3	4892329
18	7 7 58.71	23 14 3.6	0977283	23 28.5	70 32 37.2	2 49 56.3	4881082
19	7 16 57.31	23 8 11.6	1029996	23 33.6	76 51 37.3	3 31 18.0	4878851
20	7 26 0.41	22 59 37.3	1077670	23 38.8	83 10 45.7	4 10 3.6	4885680



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North.</i> <i>° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>9</i>
July 20	7 26 0.41	22 59 37.3	1077670	23 38.8	83 10 45.7	4 10 3.6	4885680
21	7 35 6.18	22 48 19.9	1120290	23 44.0	89 28 31.7	4 45 36.6	4901423
22	7 44 12.83	22 34 20.4	1157884	23 49.2	95 43 25.9	5 17 26.8	4925724
23	7 53 18.62	22 17 41.7	1190530	23 54.3	101 54 3.8	5 45 11.3	4958068
24	8 2 21.98	21 58 28.6	1218348	23 59.4	107 59 7.9	6 8 35.0	4997789
25	8 11 21.45	21 36 46.9	1241493	* *	113 57 30.2	6 27 31.0	5044115
26	8 20 15.72	21 12 43.9	1260144	0 4.4	119 48 13.1	6 41 59.2	5096202
27	8 29 3.69	20 46 27.6	1274516	0 9.2	125 30 30.8	6 52 6.5	5153182
28	8 37 44.42	20 18 6.8	1284823	0 14.0	131 3 48.8	6 58 4.4	5214173
29	8 46 17.17	19 47 50.4	1291295	0 18.6	136 27 43.5	7 0 8.6	5278327
30	8 54 41.33	19 15 47.9	1294159	0 23.1	141 42 2.4	6 58 37.5	5344838
31	9 2 56.47	18 42 8.1	1293644	0 27.4	146 46 40.8	6 53 50.8	5412964
Aug. 1	9 11 2.27	18 7 0.2	1289968	0 31.6	151 41 42.7	6 46 9.0	5482025
2	9 18 58.56	17 30 32.8	1283340	0 35.6	156 27 18.2	6 35 52.4	5551417
3	9 26 45.25	16 52 54.2	1273958	0 39.4	161 3 42.4	6 23 20.3	5620615
4	9 34 22.35	16 14 12.3	1262006	0 43.1	165 31 14.5	6 8 51.3	5689149
5	9 41 49.92	15 34 34.6	1247653	0 46.6	169 50 16.5	5 52 42.4	5756633
6	9 49 8.09	14 54 8.1	1231051	0 50.0	174 1 12.3	5 35 8.9	5822729
7	9 56 17.02	14 12 59.0	1212346	0 53.2	178 4 27.2	5 16 24.9	5887158
8	10 3 16.91	13 31 13.8	1191659	0 56.2	182 0 26.7	4 56 43.0	5949686
9	10 10 7.97	12 48 58.0	1169105	0 59.1	185 49 37.0	4 36 14.1	6010128
10	10 16 50.45	12 6 16.9	1144781	1 1.9	189 32 23.6	4 15 8.0	6068324
11	10 23 24.60	11 23 15.2	1118776	1 4.5	193 9 11.6	3 53 33.1	6124156
12	10 29 50.66	10 39 57.6	1091162	1 7.0	196 40 25.8	3 31 36.9	6177527
13	10 36 8.88	9 56 28.4	1062003	1 9.4	200 6 29.5	3 9 25.9	6228363
14	10 42 19.51	9 12 51.2	1031355	1 11.6	203 27 45.7	2 47 5.4	6276606
15	10 48 22.76	8 29 10.0	0999261	1 13.7	206 44 36.2	2 24 40.4	6322225
16	10 54 18.89	7 45 28.1	0965757	1 15.7	209 57 21.9	2 2 15.0	6365183
17	11 0 8.09	7 1 48.9	0930872	1 17.6	213 6 22.7	1 39 52.7	6405467
18	11 5 50.54	6 18 15.4	0894625	1 19.3	216 11 57.7	1 17 36.7	6443065
19	11 11 26.46	5 34 50.5	0857029	1 20.9	219 14 25.1	0 55 29.5	6477976
20	11 16 55.97	4 51 37.0	0818093	1 22.5	222 14 2.3	0 33 33.5	6510199
21	11 22 19.22	4 8 37.7	0777814	1 24.0	225 11 6.1	0 11 50.7	6539743
22	11 27 36.35	3 25 55.3	0736187	1 25.3	228 5 52.2	0 9 37.1	6566611
23	11 32 47.45	2 43 32.1	0693207	1 26.6	230 58 36.1	0 30 48.4	6590812
24	11 37 52.59	2 1 30.9	0648857	1 27.7	233 49 32.5	0 51 41.9	6612360
25	11 42 51.83	1 19 54.1	0603114	1 28.7	236 38 55.7	1 12 16.1	6631259
26	11 47 45.21	0 38 44.3	0555957	1 29.7	239 26 59.5	1 32 30.0	6647525
		<i>South.</i>					
27	11 52 32.69	0 1 56.1	0507363	1 30.5	242 13 57.1	1 52 22.5	6661164
28	11 57 14.27	0 42 4.4	0457299	1 31.3	245 0 1.8	2 11 52.5	6672186
29	12 1 49.89	1 21 38.0	0405729	1 31.9	247 45 26.2	2 30 58.9	6680593



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<div>h m s</div>	<div>South. ° ' "</div>	<div>°</div>	<div>h m</div>	<div>° ' "</div>	<div>South. ° ' "</div>	<div>9</div>
Aug. 29	12 1 49.89	1 21 38.0	0.0405729	1 31.9	247 45 26.2	2 30 58.9	6680593
	30 12 6 19.47	2 0 34.2	0.0352624	1 32.5	250 30 23.1	2 49 40.7	6686395
	31 12 10 42.85	2 38 50.3	0.0297948	1 32.9	253 15 4.6	3 7 56.9	6689596
Sept. 1	12 14 59.91	3 16 22.9	0.0241659	1 33.2	255 59 43.3	3 25 46.3	6690196
	2 12 19 10.42	3 53 9.2	0.0183725	1 33.4	258 44 31.1	3 43 7.7	6688196
	3 12 23 14.15	4 29 5.8	0.0124104	1 33.6	261 29 40.4	4 0 0.0	6683593
4	12 27 10.82	5 4 9.1	0.0062762	1 33.6	264 15 23.4	4 16 21.8	6676390
	9						
	5 12 31 0.09	5 38 15.4	0.9999669	1 33.4	267 1 52.3	4 32 11.6	6666578
6	12 34 41.54	6 11 20.4	0.9934785	1 33.2	269 49 19.9	4 47 27.8	6654148
	7 12 38 14.77	6 43 19.9	0.9868088	1 32.8	272 37 58.5	5 2 8.6	6639094
	8 12 41 39.25	7 14 8.9	0.9799559	1 32.2	275 28 1.3	5 16 12.2	6621410
9	12 44 54.41	7 43 42.2	0.9729184	1 31.5	278 19 41.3	5 29 36.4	6601086
	10 12 47 59.63	8 11 54.2	0.9656968	1 30.7	281 13 12.2	5 42 18.9	6578109
	11 12 50 54.17	8 38 38.4	0.9582927	1 29.6	284 8 47.7	5 54 17.1	6552475
12	12 53 37.27	9 3 48.2	0.9507091	1 28.4	287 6 42.4	6 5 28.1	6524165
	13 12 56 8.01	9 27 15.7	0.9429520	1 26.9	290 7 11.1	6 15 48.9	6493182
	14 12 58 25.49	9 48 52.7	0.9350307	1 25.2	293 10 29.1	6 25 15.8	6459511
15	13 0 28.63	10 8 30.2	0.9269569	1 23.3	296 16 52.6	6 33 45.2	6423154
	16 13 2 16.33	10 25 57.7	0.9187477	1 21.2	299 26 38.0	6 41 12.8	6384109
	17 13 3 47.40	10 41 4.6	0.9104257	1 18.8	302 40 2.5	6 47 34.0	6342383
18	13 5 0.57	10 53 38.9	0.9020191	1 16.0	305 57 24.3	6 52 43.8	6297990
	19 13 5 54.56	11 3 27.8	0.8935644	1 13.0	309 19 1.9	6 56 36.8	6250956
	20 13 6 28.07	11 10 17.5	0.8851070	1 9.6	312 45 14.6	6 59 7.0	6201308
21	13 6 39.79	11 13 53.6	0.8767023	1 5.8	316 16 22.6	7 0 8.0	6149100
	22 13 6 28.55	11 14 1.5	0.8684182	1 1.7	319 52 46.6	6 59 32.8	6094394
	23 13 5 53.25	11 10 26.2	0.8603357	0 57.2	323 34 47.9	6 57 14.1	6037276
24	13 4 53.09	11 2 53.5	0.8525501	0 52.2	327 22 48.7	6 53 4.1	5977853
	25 13 3 27.54	10 51 10.7	0.8451720	0 46.9	331 17 10.8	6 46 54.4	5916267
	26 13 1 36.56	10 35 7.6	0.8383272	0 41.1	335 18 17.1	6 38 36.7	5852689
27	12 59 20.64	10 14 37.4	0.8321551	0 34.9	339 26 30.1	6 28 2.2	5787331
	28 12 56 40.98	9 49 39.2	0.8268073	0 28.3	343 42 11.7	6 15 2.3	5720448
	29 12 53 39.58	9 20 19.0	0.8224422	0 21.4	348 5 43.4	5 59 28.6	5652353
30	12 50 19.34	8 46 50.7	0.8192190	0 14.1	352 37 25.6	5 41 13.2	5583407
	1 12 46 44.07	8 9 38.7	0.8172903	{ 12 46.6 }	357 17 36.5	5 20 9.4	5514046
	2 12 42 58.51	7 29 17.7	0.8167918	23 51.2	2 6 31.8	4 56 11.8	5444761
Oct. 3	12 39 8.13	6 46 32.5	0.8178326	23 43.5	7 4 24.2	4 49 17.1	5376123
	4 12 35 19.05	6 2 17.7	0.8204844	23 35.9	12 11 21.6	3 59 24.7	5308778
	5 12 31 37.71	5 17 34.3	0.8247753	23 28.5	17 27 26.8	3 26 37.6	5243443
6	12 28 10.53	4 33 27.6	0.8306852	23 21.5	22 52 36.1	2 51 2.7	5180889
	7 12 25 3.71	3 51 3.4	0.8381425	23 14.9	28 26 38.0	2 12 52.0	5121953
	8 12 22 22.76	3 11 23.5	0.8470313	23 8.8	34 9 12.5	1 32 22.7	5067497
9	12 20 12.35	2 35 23.4	0.8571958	23 3.3	39 59 50.2	0 49 58.0	5018407



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	South.	9	h m	° ' "	South.	9
Oct. 9	12 20 12.35	2 35 23.4	.8571958	23 3.3	39 59 50.2	0 49 58.0	.5018407
10	12 18 36.09	2 3 49.0	.8684510	22 58.3	45 57 50.7	0 6 6.8	.4975538
					North.		
11	12 17 36.51	1 37 16.4	.8805940	22 54.0	52 2 23.8	0 38 36.5	.4939700
12	12 17 14.95	1 16 9.7	.8934146	22 50.3	58 12 28.2	1 23 32.9	.4911614
13	12 17 31.72	1 0 42.1	.9067053	22 47.3	64 26 53.0	2 8 0.0	.4891869
14	12 18 26.19	0 50 57.1	.9202702	22 44.8	70 44 19.0	2 51 14.0	.4880894
15	12 19 56.93	0 46 49.6	.9339303	22 42.9	77 3 20.5	3 32 31.6	.4878935
16	12 22 1.93	0 48 7.5	.9475277	22 41.6	83 22 27.6	4 11 11.7	.4886043
17	12 24 38.74	0 54 32.8	.9609273	22 40.7	89 40 9.5	4 46 38.4	.4902050
18	12 27 44.62	1 5 44.6	.9740185	22 40.3	95 54 57.1	5 18 21.4	.4926606
19	12 31 16.73	1 21 18.8	.9867129	22 40.2	102 5 25.8	5 45 58.1	.4959180
20	12 35 12.19	1 40 50.1	.9989436	22 40.5	108 10 18.6	6 9 13.7	.4999116
		0					
21	12 39 28.25	2 3 53.0	.0106627	22 41.1	114 8 27.6	6 28 1.5	.5045624
22	12 44 2.25	2 30 2.3	.0218392	22 42.0	119 58 55.7	6 42 21.6	.5097871
23	12 48 51.77	2 58 53.5	.0324554	22 43.1	125 40 57.3	6 52 21.0	.5154985
24	12 53 54.59	3 30 4.0	.0425053	22 44.4	131 13 58.5	6 58 11.6	.5216082
25	12 59 8.77	4 3 12.4	.0519920	22 45.8	136 37 36.0	7 0 8.9	.5280316
26	13 4 32.54	4 37 59.2	.0609255	22 47.4	141 51 37.0	6 58 31.5	.5346885
27	13 10 4.40	5 14 6.6	.0693211	22 49.1	146 55 57.9	6 53 39.2	.5415052
28	13 15 43.06	5 51 18.7	.0771969	22 50.9	151 50 42.4	6 45 52.4	.5484129
29	13 21 27.41	6 29 20.9	.0845740	22 52.8	156 36 0.8	6 35 31.3	.5553521
30	13 27 16.51	7 8 0.8	.0914756	22 54.7	161 12 8.6	6 22 55.4	.5622705
31	13 33 9.59	7 47 6.9	.0979235	22 56.7	165 39 24.9	6 8 23.1	.5691215
Nov. 1	13 39 6.01	8 26 29.2	.1039412	22 58.8	169 58 11.7	5 52 11.3	.5758660
2	13 45 5.26	9 5 59.1	.1095510	23 0.9	174 8 53.2	5 34 35.5	.5824710
3	13 51 6.91	9 45 28.5	.1147745	23 3.0	178 11 54.5	5 15 49.6	.5889084
4	13 57 10.61	10 24 50.9	.1196317	23 5.1	182 7 41.2	4 56 6.0	.5951551
5	14 3 16.13	11 4 0.1	.1241430	23 7.3	185 56 39.6	4 35 35.8	.6011925
6	14 9 23.23	11 42 50.8	.1283263	23 9.5	189 39 14.9	4 14 28.7	.6070051
7	14 15 31.78	12 21 18.4	.1321986	23 11.8	193 15 52.6	3 52 53.0	.6125810
8	14 21 41.67	12 59 18.5	.1357757	23 14.0	196 46 57.0	3 30 56.2	.6179106
9	14 27 52.83	13 36 47.4	.1390721	23 16.3	200 12 51.7	3 8 44.8	.6229863
10	14 34 5.21	14 13 42.0	.1421017	23 18.6	203 33 59.5	2 46 24.2	.6278027
11	14 40 18.80	14 49 59.0	.1448767	23 20.9	206 50 42.3	2 23 59.1	.6323564
12	14 46 33.59	15 25 36.0	.1474081	23 23.2	210 3 21.0	2 1 33.7	.6366443
13	14 52 49.59	16 0 29.9	.1497064	23 25.5	213 12 15.3	1 39 11.6	.6406647
14	14 59 6.83	16 34 39.1	.1517806	23 27.9	216 17 44.4	1 16 55.8	.6444165
15	15 5 25.36	17 8 1.0	.1536393	23 30.3	219 20 6.4	0 54 48.9	.6478995
16	15 11 45.18	17 40 33.9	.1552898	23 32.7	222 19 38.8	0 32 53.3	.6511136
17	15 18 6.39	18 12 15.9	.1567392	23 35.1	225 16 38.1	0 11 10.9	.6540600
				South.			
18	15 24 28.99	18 43 5.2	.1579928	23 37.6	228 11 20.3	0 10 16.5	.6567387



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South.</i> <i>° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>South.</i> <i>° ' "</i>	<i>9</i>
Nov. 18	15 24 28.99	18 43 5.2	1579928	23 37.6	228 11 20.3	0 10 16.5	.6567387
19	15 30 53.05	19 13 0.0	1590564	23 40.1	231 4 0.8	0 31 27.3	.6591511
20	15 37 18.61	19 41 58.8	1599340	23 42.6	233 54 54.2	0 52 20.1	.6612979
21	15 43 45.71	20 10 0.4	1606297	23 45.1	236 44 14.8	1 12 53.8	.6631800
22	15 50 14.41	20 37 2.5	1611466	23 47.7	239 32 16.4	1 33 7.0	.6647987
23	15 56 44.73	21 3 4.2	1614876	23 50.3	242 19 12.2	1 52 58.9	.6661550
24	16 3 16.69	21 28 3.7	1616547	23 52.9	245 5 15.5	2 12 28.1	.6672491
25	16 9 50.34	21 51 59.7	1616497	23 55.6	247 50 39.0	2 31 33.8	.6680822
26	16 16 25.66	22 14 50.6	1614735	23 58.2	250 35 35.2	2 50 14.8	.6686547
27	16 23 2.69	22 36 35.2	1611267	* *	253 20 16.4	3 8 30.2	.6689671
28	16 29 41.39	22 57 11.5	1606090	0 0.9	256 4 55.2	3 26 18.7	.6690195
29	16 36 21.77	23 16 38.8	1599207	0 3.7	258 49 43.4	3 43 39.3	.6688117
30	16 43 3.83	23 34 55.2	1590601	0 6.5	261 34 53.5	4 0 30.7	.6683438
Dec. 1	16 49 47.51	23 51 59.5	1580260	0 9.3	264 20 37.7	4 16 51.4	.6676158
2	16 56 32.79	24 7 50.2	1568160	0 12.1	267 7 8.2	4 32 40.2	.6666267
3	17 3 19.61	24 22 25.9	1554275	0 14.9	269 54 37.7	4 47 55.3	.6653761
4	17 10 7.89	24 35 45.0	1538574	0 17.8	272 43 18.6	5 2 35.1	.6638630
5	17 16 57.56	24 47 46.3	1521019	0 20.7	275 33 24.1	5 16 37.5	.6620870
6	17 23 48.51	24 58 28.3	1501564	0 23.6	278 25 7.2	5 30 0.5	.6600467
7	17 30 40.60	25 7 49.6	1480157	0 26.5	281 18 41.5	5 42 41.6	.6577412
8	17 37 33.72	25 15 48.8	1456742	0 29.5	284 14 20.9	5 54 38.4	.6551699
9	17 44 27.67	25 22 24.8	1431255	0 32.4	287 12 19.9	6 5 47.9	.6523311
10	17 51 22.29	25 27 35.8	1403626	0 35.4	290 12 53.4	6 16 7.0	.6492247
11	17 58 17.36	25 31 21.2	1373769	0 38.4	293 16 16.6	6 25 32.2	.6458497
12	18 5 12.63	25 33 39.3	1341599	0 41.4	296 22 45.7	6 33 59.7	.6422059
13	18 12 7.82	25 34 29.5	1307020	0 44.3	299 32 37.3	6 41 25.4	.6382933
14	18 19 2.63	25 33 50.4	1269925	0 47.3	302 46 8.6	6 47 44.5	.6341129
15	18 25 56.72	25 31 41.3	1230200	0 50.3	306 3 37.6	6 52 52.1	.6296656
16	18 32 49.66	25 28 1.4	1187721	0 53.2	309 25 23.0	6 56 42.6	.6249543
17	18 39 41.03	25 22 50.2	1142351	0 56.1	312 51 44.1	6 59 10.2	.6199819
18	18 46 30.35	25 16 7.5	1093945	0 59.0	316 23 1.1	7 0 8.4	.6147534
19	18 53 17.01	25 7 53.0	1042347	1 1.9	319 59 34.7	6 59 30.2	.6092755
20	19 0 0.40	24 58 7.1	0987388	1 4.7	323 41 46.4	6 57 8.2	.6035566
21	19 6 39.79	24 46 50.3	0928897	1 7.4	327 29 58.0	6 52 54.7	.5976075
22	19 13 14.37	24 34 3.9	0866686	1 10.0	331 24 31.8	6 46 41.3	.5914428
23	19 19 43.19	24 19 49.2	0800562	1 12.5	335 25 50.3	6 38 19.6	.5850789
24	19 26 5.23	24 4 8.5	0730327	1 14.9	339 34 16.2	6 27 40.9	.5785379
25	19 32 19.31	23 47 4.8	0655784	1 17.2	343 50 11.4	6 14 36.4	.5718455
26	19 38 24.10	23 28 41.6	0576733	1 19.4	348 13 57.3	5 58 58.0	.5650326
27	19 44 18.09	23 9 3.8	0492984	1 21.3	352 45 54.2	5 40 37.7	.5581358
28	19 49 59.61	22 48 17.1	0404360	1 23.1	357 26 20.5	5 19 28.7	.5511987
29	19 55 26.73	22 26 28.6	0310713	1 24.6	2 15 31.6	4 55 25.9	.5442708
30	20 0 37.35	22 3 46.7	0211932	1 25.8	7 13 40.1	4 28 25.8	.5374093
31	20 5 29.10	21 40 21.6	0107961	1 26.7	12 20 53.7	3 58 28.2	.5306793
			9				
32	20 9 59.37	21 16 25.1	9998818	1 27.2	17 37 15.3	3 25 36.0	.5241524



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan.	<i>h m s</i>	<i>South.</i>	<i>9</i>	<i>h m</i>	<i>South.</i>	<i>9</i>	
	1 21 56 44.32	13 6 19.5	7290074	3 12.9	68 44 1.7	0 24 3.4	8578900
	2 21 59 47.47	12 42 13.0	7230986	3 12.0	70 20 39.0	0 18 21.6	8578177
	3 22 2 46.57	12 18 3.4	7171279	3 11.0	71 57 18.1	0 12 38.8	8577467
	4 22 5 41.52	11 53 52.0	7110950	3 10.0	73 33 59.0	0 6 55.2	8576768
	5 22 8 32.21	11 29 40.0	7050003	3 8.9	75 10 41.7	0 1 11.2	8576082
					<i>North.</i>		
	6 22 11 18.51	11 5 28.8	6988443	3 7.7	76 47 26.3	0 4 33.0	8575410
	7 22 14 0.31	10 41 19.5	6926275	3 6.4	78 24 12.6	0 10 17.0	8574752
	8 22 16 37.48	10 17 13.7	6863505	3 5.1	80 1 0.7	0 16 0.7	8574108
	9 22 19 9.89	9 53 12.6	6800141	3 3.7	81 37 50.7	0 21 43.7	8573480
	10 22 21 37.38	9 29 17.7	6736199	3 2.2	83 14 42.4	0 27 25.7	8572866
	11 22 23 59.83	9 5 30.2	6671695	3 0.6	84 51 35.9	0 33 6.5	8572269
	12 22 26 17.07	8 41 51.8	6606645	2 59.0	86 28 31.1	0 38 45.8	8571689
	13 22 28 28.96	8 18 23.8	6541068	2 57.2	88 5 28.1	0 44 23.4	8571126
	14 22 30 35.33	7 55 7.9	6474988	2 55.4	89 42 26.9	0 49 59.0	8570580
	15 22 32 36.00	7 32 5.8	6408434	2 53.4	91 19 27.3	0 55 32.3	8570052
	16 22 34 30.80	7 9 19.0	6341438	2 51.4	92 56 29.5	1 1 3.0	8569542
	17 22 36 19.56	6 46 49.5	6274035	2 49.2	94 33 33.3	1 6 30.8	8569052
	18 22 38 2.09	6 24 38.9	6206263	2 47.0	96 10 38.8	1 11 55.5	8568580
	19 22 39 38.22	6 2 48.9	6138166	2 44.7	97 47 45.8	1 17 16.8	8568128
	20 22 41 7.74	5 41 21.5	6069795	2 42.2	99 24 54.5	1 22 34.5	8567696
	21 22 42 30.47	5 20 18.6	6001206	2 39.6	101 2 4.7	1 27 48.3	8567284
	22 22 43 46.23	4 59 42.2	5932455	2 36.9	102 39 16.5	1 32 58.0	8566894
	23 22 44 54.84	4 39 34.3	5863607	2 34.1	104 16 29.7	1 38 3.2	8566524
	24 22 45 56.09	4 19 56.9	5794732	2 31.2	105 53 44.4	1 43 3.8	8566175
	25 22 46 49.80	4 0 52.2	5725909	2 28.2	107 31 0.6	1 47 59.5	8565848
	26 22 47 35.76	3 42 22.4	5657222	2 25.0	109 8 18.0	1 52 50.1	8565543
	27 22 48 13.77	3 24 30.0	5588761	2 21.7	110 45 36.8	1 57 35.3	8565260
	28 22 48 43.65	3 7 17.3	5520625	2 18.2	112 22 56.9	2 2 14.9	8564999
	29 22 49 5.21	2 50 46.9	5452921	2 14.6	114 0 18.2	2 6 48.6	8564761
	30 22 49 18.28	2 35 1.3	5385768	2 10.9	115 37 40.7	2 11 16.3	8564545
Feb.	31 22 49 22.69	2 20 3.2	5319294	2 7.0	117 15 4.3	2 15 37.7	8564353
	1 22 49 18.29	2 5 55.3	5253639	2 3.0	118 52 29.0	2 19 52.5	8564183
	2 22 49 4.95	1 52 40.0	5188955	1 58.8	120 29 54.7	2 24 0.7	8564037
	3 22 48 42.56	1 40 20.3	5125406	1 54.5	122 7 21.3	2 28 2.0	8563914
	4 22 48 11.06	1 28 59.1	5063168	1 50.0	123 44 48.8	2 31 56.1	8563814
	5 22 47 30.42	1 18 38.8	5002424	1 45.4	125 22 17.1	2 35 42.9	8563738
	6 22 46 40.67	1 9 21.9	4943365	1 40.7	126 59 46.2	2 39 22.2	8563686
	7 22 45 41.87	1 1 10.9	4886197	1 35.8	128 37 15.9	2 42 53.9	8563657
	8 22 44 34.13	0 54 8.4	4831132	1 30.7	130 14 46.2	2 46 17.7	8563652
	9 22 43 17.62	0 48 16.3	4778392	1 25.5	131 52 17.1	2 49 33.4	8563671
	10 22 41 52.58	0 43 36.3	4728201	1 20.1	133 29 48.4	2 52 41.0	8563713
	11 22 40 19.31	0 40 10.2	4680784	1 14.7	135 7 20.1	2 55 40.3	8563779



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	South. ° ' "	9	h m	° ' "	North. ° ' "	9
Feb. 11	22 40 19.31	0 40 10.2	.4680784	1 14.7	135 7 20.1	2 55 40.3	.8563779
12	22 38 38.17	0 37 59.3	.4636363	1 9.0	136 44 52.1	2 58 31.1	.8563869
13	22 36 49.62	0 37 4.3	.4595170	1 3.3	138 22 24.3	3 1 13.3	.8563982
14	22 34 54.20	0 37 25.7	.4557429	0 57.5	139 59 56.6	3 3 46.7	.8564119
15	22 32 52.51	0 39 3.3	.4523350	0 51.5	141 37 29.0	3 6 11.3	.8564279
16	22 30 45.23	0 41 56.6	.4493128	0 45.5	143 15 1.4	3 8 26.9	.8564462
17	22 28 33.10	0 46 4.2	.4466946	0 39.3	144 52 33.6	3 10 33.4	.8564668
18	22 26 16.90	0 51 24.4	.4444969	0 33.2	146 30 5.7	3 12 30.7	.8564897
19	22 23 57.52	0 57 54.6	.4427337	0 26.9	148 7 37.4	3 14 18.7	.8565149
20	22 21 35.86	1 5 31.9	.4414166	0 20.6	149 45 8.8	3 15 57.3	.8565423
21	22 19 12.86	1 14 12.6	.4405538	0 14.3	151 22 39.7	3 17 26.5	.8565720
22	22 16 49.46	1 23 52.7	.4401507	0 8.0	153 0 10.1	3 18 46.2	.8566039
23	22 14 26.61	1 34 27.8	.4402101	{0.5.7}	154 37 39.8	3 19 56.2	.8566379
24	22 12 5.24	1 45 53.0	.4407320	23 49.2	156 15 8.8	3 20 56.7	.8566741
25	22 9 46.27	1 58 3.1	.4417130	23 43.1	157 52 36.9	3 21 47.4	.8567124
26	22 7 30.60	2 10 52.7	.4431470	23 37.0	159 30 4.2	3 22 28.5	.8567528
27	22 5 19.08	2 24 16.1	.4450254	23 30.9	161 7 30.4	3 22 59.8	.8567952
28	22 3 12.51	2 38 8.0	.4473369	23 25.0	162 44 55.6	3 23 21.3	.8568397
Mar. 1	22 1 11.65	2 52 22.4	.4500683	23 19.2	164 22 19.6	3 23 33.1	.8568861
2	21 59 17.20	3 6 53.5	.4532037	23 13.5	165 59 42.3	3 23 35.1	.8569345
3	21 57 29.78	3 21 35.9	.4567257	23 7.9	167 37 3.7	3 23 27.3	.8569848
4	21 55 49.97	3 36 24.2	.4606159	23 2.4	169 14 23.7	3 23 9.7	.8570309
5	21 54 18.25	3 51 13.1	.4648543	22 57.1	170 51 42.2	3 22 42.4	.8570909
6	21 52 55.04	4 5 57.5	.4694201	22 51.9	172 28 59.1	3 22 5.4	.8571467
7	21 51 40.70	4 20 32.7	.4742919	22 46.9	174 6 14.3	3 21 18.7	.8572041
8	21 50 35.50	4 34 54.5	.4794476	22 42.0	175 43 27.8	3 20 22.4	.8572633
9	21 49 39.67	4 48 58.7	.4848657	22 37.3	177 20 39.5	3 19 16.5	.8573241
10	21 48 53.37	5 2 41.8	.4905247	22 32.8	178 57 49.3	3 18 1.1	.8573865
11	21 48 16.69	5 16 0.2	.4964033	22 28.4	180 34 57.1	3 16 36.2	.8574504
12	21 47 49.67	5 28 50.9	.5024809	22 24.2	182 12 3.0	3 15 2.0	.8575158
13	21 47 32.31	5 41 11.2	.5087373	22 20.1	183 49 6.7	3 13 18.5	.8575827
14	21 47 24.56	5 52 58.6	.5151531	22 16.2	185 26 8.3	3 11 25.8	.8576509
15	21 47 26.34	6 4 11.0	.5217095	22 12.4	187 3 7.6	3 9 24.1	.8577204
16	21 47 37.53	6 14 46.8	.5283888	22 8.8	188 40 4.7	3 7 13.3	.8577911
17	21 47 57.99	6 24 43.9	.5351740	22 5.4	190 16 59.5	3 4 53.7	.8578631
18	21 48 27.58	6 34 1.0	.5420490	22 2.1	191 53 51.9	3 2 25.3	.8579362
19	21 49 6.08	6 42 36.9	.5489987	21 58.9	193 30 41.8	2 59 48.3	.8580104
20	21 49 53.27	6 50 30.8	.5560091	21 55.9	195 7 29.3	2 57 2.9	.8580856
21	21 50 48.89	6 57 42.1	.5630667	21 53.0	196 44 14.3	2 54 9.0	.8581617
22	21 51 52.71	7 4 9.8	.5701588	21 50.2	198 20 56.7	2 51 7.0	.8582388
23	21 53 4.46	7 9 53.7	.5772742	21 47.6	199 57 36.5	2 47 57.0	.8583167
24	21 54 23.89	7 14 53.6	.5844027	21 45.1	201 34 13.7	2 44 39.1	.8583954



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	<i>Apparent Right Ascension.</i>	<i>Apparent Declination.</i>	<i>Log. of True Dist. from the Earth.</i>	<i>Meridian Passage.</i>	<i>Longitude.</i>	<i>Latitude.</i>	<i>Log. of Rad. Vect.</i>
	<i>Noon.</i>	<i>Noon.</i>	<i>Noon.</i>		<i>Noon.</i>	<i>Noon.</i>	<i>Noon.</i>
	<i>h m s</i>	<i>South. ° ' "</i>	<i>9</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>9</i>
Mar. 24	21 54 23.89	7 14 53.6	.5844027	21 45.1	201 34 13.7	2 44 39.1	.8583954
25	21 55 50.70	7 19 9.4	.5915352	21 42.7	203 10 48.2	2 41 13.4	.8584748
26	21 57 24.60	7 22 41.2	.5986636	21 40.4	204 47 20.1	2 37 40.2	.8585549
27	21 59 5.31	7 25 29.1	.6057804	21 38.3	206 23 49.2	2 33 59.6	.8586355
28	22 0 52.55	7 27 33.3	.6128788	21 36.2	208 0 15.7	2 30 11.9	.8587167
29	22 2 46.06	7 28 54.0	.6199526	21 34.3	209 36 39.4	2 26 17.2	.8587984
30	22 4 45.59	7 29 31.5	.6269966	21 32.4	211 13 0.3	2 22 15.7	.8588804
31	22 6 50.87	7 29 26.3	.6340060	21 30.6	212 49 18.5	2 18 7.5	.8589628
Apr. 1	22 9 1.64	7 28 38.9	.6409769	21 29.0	214 25 33.9	2 13 53.0	.8590455
2	22 11 17.64	7 27 9.8	.6479055	21 27.4	216 1 46.6	2 9 32.3	.8591283
3	22 13 38.66	7 24 59.5	.6547886	21 25.8	217 37 56.5	2 5 5.6	.8592113
4	22 16 4.47	7 22 8.4	.6616237	21 24.4	219 14 3.6	2 0 33.1	.8592943
5	22 18 34.85	7 18 37.0	.6684081	21 23.0	220 50 8.0	1 55 55.1	.8593774
6	22 21 9.60	7 14 26.0	.6751396	21 21.7	222 26 9.6	1 51 11.8	.8594603
7	22 23 48.50	7 9 36.1	.6818165	21 20.5	224 2 8.6	1 46 23.4	.8595432
8	22 26 31.37	7 4 7.8	.6884375	21 19.3	225 38 4.8	1 41 30.2	.8596259
9	22 29 18.02	6 58 1.7	.6950017	21 18.2	227 13 58.4	1 36 32.3	.8597083
10	22 32 8.29	6 51 18.5	.7015080	21 17.2	228 49 49.3	1 31 30.0	.8597904
11	22 35 2.00	6 43 58.9	.7079552	21 16.2	230 25 37.6	1 26 23.6	.8598721
12	22 37 58.99	6 36 3.5	.7143428	21 15.2	232 1 23.3	1 21 13.2	.8599534
13	22 40 59.11	6 27 32.9	.7206700	21 14.3	233 37 6.5	1 15 59.2	.8600342
14	22 44 2.22	6 18 27.7	.7269363	21 13.5	235 12 47.2	1 10 41.8	.8601144
15	22 47 8.20	6 8 48.5	.7331415	21 12.7	236 48 25.4	1 5 21.3	.8601946
16	22 50 16.93	5 58 36.1	.7392848	21 11.9	238 24 1.1	0 59 57.8	.8602725
17	22 53 28.28	5 47 51.2	.7453654	21 11.2	239 59 34.5	0 54 31.6	.8603511
18	22 56 42.12	5 36 34.3	.7513833	21 10.5	241 35 5.5	0 49 3.1	.8604281
19	22 59 58.34	5 24 46.2	.7573382	21 9.9	243 10 34.2	0 43 32.4	.8605041
20	23 3 16.82	5 12 27.6	.7632301	21 9.3	244 46 0.7	0 37 59.8	.8605801
21	23 6 37.46	4 59 39.4	.7690586	21 8.7	246 21 25.0	0 32 25.5	.8606541
22	23 10 0.16	4 46 22.3	.7748243	21 8.2	247 56 47.1	0 26 49.9	.8607281
23	23 13 24.80	4 32 37.0	.7805277	21 7.7	249 32 7.2	0 21 13.1	.8608001
24	23 16 51.30	4 18 24.3	.7861688	21 7.2	251 7 25.3	0 15 35.5	.8608721
25	23 20 19.55	4 3 45.0	.7917475	21 6.7	252 42 41.4	0 9 57.3	.8609421
26	23 23 49.49	3 48 39.9	.7972645	21 6.3	254 17 55.7	0 4 18.7	.8610101
27	23 27 21.03	3 33 9.8	.8027206	21 5.9	255 53 8.2	South. 0 1 20.0	.8610781
28	23 30 54.11	3 17 15.5	.8081162	21 5.6	257 28 18.9	0 6 58.5	.8611441
29	23 34 28.65	3 0 57.8	.8134520	21 5.2	259 3 27.9	0 12 36.6	.8612091
30	23 38 4.59	2 44 17.3	.8187286	21 4.9	260 38 35.3	0 18 14.0	.8612771
May 1	23 41 41.88	2 27 14.9	.8239465	21 4.6	262 13 41.2	0 23 50.5	.8613341
2	23 45 20.47	2 9 51.3	.8291066	21 4.3	263 48 45.6	0 29 25.8	.8613941
3	23 49 0.30	1 52 7.4	.8342095	21 4.0	265 23 48.6	0 34 59.6	.8614521
4	23 52 41.32	1 34 3.9	.8392561	21 3.8	266 58 50.3	0 40 31.8	.8615091



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
May	h m s	South. ° ' "	9	h m	° ' "	South. ° ' "	9
	4 23 52 41.32	1 34 3.9	.8392561	21 3.8	266 58 50.3	0 40 31.8	.8615097
	5 23 56 23.50	1 15 41.7	.8442470	21 3.6	268 33 50.7	0 46 2.0	.8615649
	6 0 0 6.81	0 57 1.3	.8491833	21 3.4	270 8 50.0	0 51 30.1	.8616184
	7 0 3 51.21	0 38 3.5	.8540658	21 3.2	271 43 48.1	0 56 55.6	.8616700
	8 0 7 36.66	0 18 49.2	.8588953	21 3.0	273 18 45.2	1 2 18.5	.8617199
	North.						
	9 0 11 23.13	0 0 40.9	.8636722	21 2.9	274 53 41.4	1 7 38.5	.8617680
	10 0 15 10.61	0 20 26.0	.8683976	21 2.7	276 28 36.7	1 12 55.4	.8618141
	11 0 18 59.10	0 40 25.5	.8730723	21 2.6	278 3 31.1	1 18 8.8	.8618583
	12 0 22 48.57	1 0 38.6	.8776967	21 2.5	279 38 24.8	1 23 18.6	.8619006
	13 0 26 39.02	1 21 4.8	.8822714	21 2.4	281 13 17.8	1 28 24.5	.8619409
	14 0 30 30.43	1 41 43.3	.8867968	21 2.3	282 48 10.3	1 33 26.4	.8619792
	15 0 34 22.80	2 2 33.5	.8912735	21 2.3	284 23 2.2	1 38 23.9	.8620154
	16 0 38 16.13	2 23 34.6	.8957019	21 2.2	285 57 53.7	1 43 16.8	.8620496
	17 0 42 10.40	2 44 45.7	.9000824	21 2.2	287 32 44.7	1 48 5.1	.8620817
	18 0 46 5.61	3 6 6.1	.9044155	21 2.2	289 7 35.5	1 52 48.3	.8621116
	19 0 50 1.75	3 27 35.2	.9087017	21 2.2	290 42 26.0	1 57 26.3	.8621394
	20 0 53 58.81	3 49 12.2	.9129413	21 2.3	292 17 16.3	2 1 59.0	.8621651
	21 0 57 56.81	4 10 56.4	.9171348	21 2.3	293 52 6.5	2 6 26.1	.8621886
	22 1 1 55.72	4 32 47.0	.9212826	21 2.3	295 26 56.7	2 10 47.3	.8622098
	23 1 5 55.54	4 54 43.1	.9253852	21 2.4	297 1 46.9	2 15 2.6	.8622289
	24 1 9 56.28	5 16 44.1	.9294431	21 2.5	298 36 37.1	2 19 11.7	.8622457
	25 1 13 57.93	5 38 49.3	.9334569	21 2.6	300 11 27.5	2 23 14.4	.8622603
	26 1 18 0.51	6 0 57.9	.9374271	21 2.7	301 46 18.1	2 27 10.6	.8622726
	27 1 22 4.01	6 23 9.0	.9413541	21 2.8	303 21 8.9	2 31 0.0	.8622827
	28 1 26 8.44	6 45 22.0	.9452383	21 3.0	304 56 0.1	2 34 42.6	.8622905
	29 1 30 13.80	7 7 36.2	.9490803	21 3.1	306 30 51.6	2 38 18.1	.8622960
	30 1 34 20.10	7 29 50.7	.9528808	21 3.3	308 5 43.6	2 41 46.4	.8622993
	31 1 38 27.34	7 52 4.8	.9566405	21 3.5	309 40 36.0	2 45 7.3	.8623003
June	1 1 42 35.54	8 14 17.7	.9603599	21 3.7	311 15 29.0	2 48 20.6	.8622990
	2 1 46 44.70	8 36 28.7	.9640394	21 3.9	312 50 22.5	2 51 26.3	.8622954
	3 1 50 54.83	8 58 37.1	.9676798	21 4.2	314 25 16.7	2 54 24.2	.8622895
	4 1 55 5.93	9 20 42.1	.9712820	21 4.4	316 0 11.5	2 57 14.1	.8622814
	5 1 59 18.03	9 42 43.0	.9748462	21 4.7	317 35 7.0	2 59 55.9	.8622710
	6 2 3 31.15	10 4 39.1	.9783725	21 5.0	319 10 3.3	3 2 29.5	.8622584
	7 2 7 45.29	10 26 29.7	.9818619	21 5.3	320 45 0.4	3 4 54.8	.8622434
	8 2 12 0.46	10 48 14.0	.9853154	21 5.6	322 19 58.3	3 7 11.6	.8622263
	9 2 16 16.69	11 9 51.4	.9887331	21 6.0	323 54 57.1	3 9 19.9	.8622069
	10 2 20 34.00	11 31 21.1	.9921153	21 6.3	325 29 56.8	3 11 19.6	.8621854
	11 2 24 52.40	11 52 42.4	.9954624	21 6.7	327 4 57.5	3 13 10.5	.8621616
	12 2 29 11.92	12 13 54.6	.9987750	21 7.1	328 39 59.1	3 14 52.6	.8621356
	13 2 33 32.57	12 34 57.0	.0020532	21 7.5	330 15 1.8	3 16 25.8	.8621075



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>South. ° ' "</i>	<i>9</i>
June 13	2 33 32.57	12 34 57.0	0020532	21 7.5	330 15 1.8	3 16 25.8	8621075
14	2 37 54.36	12 55 49.0	0052973	21 8.0	331 50 5.5	3 17 50.0	8620772
15	2 42 17.30	13 16 29.8	0085076	21 8.4	333 25 10.4	3 19 5.2	8620448
16	2 46 41.41	13 36 58.6	0116845	21 8.9	335 0 16.3	3 20 11.2	8620103
17	2 51 6.69	13 57 14.7	0148282	21 9.4	336 35 23.4	3 21 8.1	8619738
18	2 55 33.17	14 17 17.4	0179387	21 9.9	338 10 31.6	3 21 55.8	8619352
19	3 0 0.84	14 37 6.0	0210163	21 10.5	339 45 41.0	3 22 34.3	8618945
20	3 4 29.71	14 56 39.7	0240614	21 11.0	341 20 51.6	3 23 3.5	8618519
21	3 8 59.80	15 15 57.9	0270742	21 11.6	342 56 3.4	3 23 23.3	8618074
22	3 13 31.10	15 34 59.7	0300550	21 12.2	344 31 16.5	3 23 33.8	8617609
23	3 18 3.62	15 53 44.5	0330040	21 12.8	346 6 30.8	3 23 35.0	8617126
24	3 22 37.36	16 12 11.4	0359213	21 13.4	347 41 46.4	3 23 26.8	8616624
25	3 27 12.33	16 30 19.8	0388073	21 14.1	349 17 3.3	3 23 9.3	8616104
26	3 31 48.52	16 48 8.9	0416624	21 14.8	350 52 21.5	3 22 42.4	8615567
27	3 36 25.93	17 5 38.1	0444869	21 15.5	352 27 41.0	3 22 6.2	8615012
28	3 41 4.56	17 22 46.5	0472812	21 16.2	354 3 1.9	3 21 20.6	8614440
29	3 45 44.40	17 39 33.6	0500456	21 16.9	355 38 24.2	3 20 25.8	8613852
30	3 50 25.44	17 55 58.7	0527804	21 17.7	357 13 47.9	3 19 21.7	8613248
July 1	3 55 7.69	18 12 0.9	0554859	21 18.5	358 49 12.9	3 18 8.4	8612628
2	3 59 51.13	18 27 39.5	0581626	21 19.3	0 24 39.4	3 16 46.0	8611993
3	4 4 35.76	18 42 54.0	0608109	21 20.1	2 0 7.3	3 15 14.4	8611344
4	4 9 21.56	18 57 43.7	0634314	21 20.9	3 35 36.6	3 13 33.8	8610681
5	4 14 8.53	19 12 7.9	0660243	21 21.8	5 11 7.3	3 11 44.3	8610003
6	4 18 56.66	19 26 6.1	0685896	21 22.7	6 46 39.5	3 9 45.8	8609313
7	4 23 45.93	19 39 37.6	0711279	21 23.6	8 22 13.2	3 7 38.5	8608610
8	4 28 36.33	19 52 41.6	0736396	21 24.5	9 57 48.3	3 5 22.5	8607895
9	4 33 27.86	20 5 17.6	0761248	21 25.4	11 33 25.0	3 2 57.8	8607168
10	4 38 20.50	20 17 25.1	0785838	21 26.4	13 9 3.1	3 0 24.6	8606430
11	4 43 14.23	20 29 3.4	0810170	21 27.3	14 44 42.7	2 57 43.0	8605682
12	4 48 9.03	20 40 12.1	0834246	21 28.3	16 20 23.8	2 54 53.1	8604924
13	4 53 4.87	20 50 50.5	0858066	21 29.3	17 56 6.5	2 51 55.1	8604156
14	4 58 1.73	21 0 58.1	0881632	21 30.4	19 31 50.7	2 48 48.9	8603380
15	5 2 59.59	21 10 34.3	0904946	21 31.4	21 7 36.4	2 45 34.9	8602596
16	5 7 58.43	21 19 38.7	0928010	21 32.4	22 43 23.7	2 42 13.1	8601804
17	5 12 58.20	21 28 10.7	0950823	21 33.5	24 19 12.5	2 38 43.7	8601006
18	5 17 58.88	21 36 9.8	0973387	21 34.6	25 55 3.0	2 35 6.8	8600202
19	5 23 0.42	21 43 35.5	0995703	21 35.7	27 30 55.0	2 31 22.6	8599391
20	5 28 2.80	21 50 27.5	1017775	21 36.8	29 6 48.6	2 27 31.2	8598576
21	5 33 5.97	21 56 45.2	1039601	21 37.9	30 42 43.8	2 23 32.9	8597757
22	5 38 9.90	22 2 28.3	1061180	21 39.0	32 18 40.6	2 19 27.8	8596933
23	5 43 14.55	22 7 36.4	1082516	21 40.2	33 54 39.0	2 15 16.1	8596107
24	5 48 19.86	22 12 9.1	1103612	21 41.4	35 30 39.1	2 10 58.0	8595278



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	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div> <div>h m s</div> <div>North.</div> <div>° ' "</div> </div> <div> <div>o</div> <div></div> </div> <div> <div>h m</div> <div>° ' "</div> <div>South.</div> <div>9</div> </div> </div>							
July 24	5 48 19.86	22 12 9.1	1103612	21 41.4	35 30 39.1	2 10 58.0	8595278
25	5 53 25.78	22 16 6.1	1124469	21 42.5	37 6 40.8	2 6 33.6	8594448
26	5 58 32.28	22 19 26.9	1145089	21 43.7	38 42 44.1	2 2 3.2	8593616
27	6 3 39.30	22 22 11.3	1165474	21 44.9	40 18 49.1	1 57 27.1	8592783
28	6 8 46.80	22 24 19.2	1185626	21 46.1	41 54 55.8	1 52 45.3	8591951
29	6 13 54.72	22 25 50.2	1205546	21 47.3	43 31 4.2	1 47 58.1	8591120
30	6 19 3.01	22 26 44.1	1225236	21 48.5	45 7 14.3	1 43 5.7	8590290
31	6 24 11.62	22 27 0.8	1244700	21 49.7	46 43 26.1	1 38 8.4	8589462
Aug. 1	6 29 20.50	22 26 40.0	1263942	21 50.9	48 19 39.6	1 33 6.4	8588637
2	6 34 29.61	22 25 41.7	1282964	21 52.1	49 55 54.9	1 27 59.8	8587815
3	6 39 38.89	22 24 5.6	1301767	21 53.3	51 32 11.8	1 22 49.1	8586997
4	6 44 48.29	22 21 51.8	1320354	21 54.5	53 8 30.6	1 17 34.3	8586184
5	6 49 57.77	22 19 0.3	1338726	21 55.7	54 44 51.0	1 12 15.7	8585376
6	6 55 7.29	22 15 30.9	1356886	21 57.0	56 21 13.3	1 6 53.6	8584575
7	7 0 16.79	22 11 23.7	1374837	21 58.2	57 57 37.3	1 1 28.3	8583780
8	7 5 26.23	22 6 38.7	1392582	21 59.4	59 34 3.1	0 55 59.9	8582992
9	7 10 35.56	22 1 15.9	1410124	22 0.6	61 10 30.7	0 50 28.7	8582212
10	7 15 44.73	21 55 15.5	1427462	22 1.8	62 47 0.0	0 44 55.1	8581441
11	7 20 53.72	21 48 37.6	1444597	22 3.0	64 23 31.2	0 39 19.2	8580680
12	7 26 2.47	21 41 22.3	1461529	22 4.2	66 0 4.2	0 33 41.3	8579927
13	7 31 10.94	21 33 29.6	1478261	22 5.4	67 36 38.9	0 28 1.7	8579186
14	7 36 19.08	21 24 59.9	1494793	22 6.6	69 13 15.5	0 22 20.7	8578455
15	7 41 26.86	21 15 53.4	1511126	22 7.8	70 49 53.9	0 16 38.5	8577736
16	7 46 34.24	21 6 10.2	1527259	22 9.0	72 26 34.1	0 10 55.4	8577029
17	7 51 41.18	20 55 50.6	1543193	22 10.1	74 3 16.1	0 5 11.7	8576335
18	7 56 47.65	20 44 54.8	1558929	22 11.3	75 39 59.9	0 0 32.4	8575654
19	8 1 53.60	20 33 23.2	1574469	22 12.4	77 16 45.6	0 6 16.6	8574986
20	8 6 59.00	20 21 16.2	1589814	22 13.5	78 53 33.0	0 12 0.6	8574334
21	8 12 3.82	20 8 34.0	1604963	22 14.7	80 30 22.3	0 17 44.1	8573696
22	8 17 8.01	19 55 17.1	1619915	22 15.8	82 7 13.3	0 23 26.8	8573073
23	8 22 11.55	19 41 25.7	1634675	22 16.9	83 44 6.1	0 29 8.6	8572466
24	8 27 14.41	19 27 0.4	1649242	22 18.0	85 21 0.6	0 34 49.0	8571876
25	8 32 16.57	19 12 1.6	1663618	22 19.1	86 57 56.9	0 40 27.9	8571303
26	8 37 17.99	18 56 29.8	1677804	22 20.2	88 34 55.0	0 46 4.9	8570747
27	8 42 18.65	18 40 25.4	1691801	22 21.2	90 11 54.7	0 51 39.8	8570209
28	8 47 18.53	18 23 48.9	1705611	22 22.3	91 48 56.2	0 57 12.3	8569689
29	8 52 17.61	18 6 40.8	1719235	22 23.3	93 25 59.4	1 2 42.2	8569188
30	8 57 15.88	17 49 1.6	1732675	22 24.3	95 3 4.1	1 8 9.1	8568706
31	9 2 13.32	17 30 52.0	1745933	22 25.3	96 40 10.6	1 13 32.9	8568243
Sept. 1	9 7 9.93	17 12 12.4	1759011	22 26.3	98 17 18.6	1 18 53.2	8567800
2	9 12 5.68	16 53 3.4	1771912	22 27.3	99 54 28.2	1 24 9.8	8567377
3	9 17 0.58	16 33 25.5	1784638	22 28.4	101 31 39.4	1 29 22.4	8566975



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	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div>h m s</div> <div>° ' "</div> <div>°</div> <div>h m</div> <div>° ' "</div> <div>° ' "</div> <div>9</div> </div>							
Sept. 3	9 17 0.58	16 33 25.5	1784638	22 28.4	101 31 39.4	1 29 22.4	8566975
4	9 21 54.63	16 13 19.4	1797190	22 29.3	103 8 52.0	1 34 30.8	8566593
5	9 26 47.82	15 52 45.6	1809571	22 30.1	104 46 6.2	1 39 34.7	8566233
6	9 31 40.16	15 31 44.8	1821783	22 31.0	106 23 21.7	1 44 33.9	8565894
7	9 36 31.64	15 10 17.6	1833827	22 31.9	108 0 38.6	1 49 28.1	8565577
8	9 41 22.28	14 48 24.5	1845704	22 32.8	109 37 56.9	1 54 17.1	8565282
9	9 46 12.09	14 26 6.2	1857414	22 33.7	111 15 16.5	1 59 0.6	8565009
10	9 51 1.07	14 3 23.3	1868959	22 34.6	112 52 37.3	2 3 38.5	8564759
11	9 55 49.23	13 40 16.5	1880339	22 35.4	114 29 59.4	2 8 10.4	8564531
12	10 0 36.59	13 16 46.4	1891554	22 36.2	116 7 22.6	2 12 36.2	8564327
13	10 5 23.15	12 52 53.6	1902605	22 37.1	117 44 46.8	2 16 55.6	8564145
14	10 10 8.95	12 28 38.9	1913494	22 37.9	119 22 12.1	2 21 8.5	8563987
15	10 14 53.98	12 4 2.8	1924220	22 38.7	120 59 38.4	2 25 14.6	8563853
16	10 19 38.27	11 39 6.0	1934784	22 39.4	122 37 5.6	2 29 13.8	8563742
17	10 24 21.83	11 13 49.2	1945186	22 40.2	124 14 33.6	2 33 5.7	8563654
18	10 29 4.70	10 48 13.1	1955427	22 41.0	125 52 2.4	2 36 50.3	8563591
19	10 33 46.89	10 22 18.4	1965507	22 41.7	127 29 32.0	2 40 27.3	8563551
20	10 38 28.41	9 56 5.8	1975426	22 42.5	129 7 2.1	2 43 56.6	8563535
21	10 43 9.28	9 29 36.0	1985185	22 43.2	130 44 32.9	2 47 18.0	8563543
22	10 47 49.54	9 2 49.8	1994784	22 43.9	132 22 4.1	2 50 31.3	8563574
23	10 52 29.21	8 35 47.7	2004225	22 44.6	133 59 35.8	2 53 36.4	8563629
24	10 57 8.31	8 8 30.5	2013508	22 45.3	135 37 7.7	2 56 33.2	8563707
25	11 1 46.87	7 40 59.0	2022633	22 46.0	137 14 40.0	2 59 21.4	8563809
26	11 6 24.92	7 13 13.8	2031601	22 46.7	138 52 12.4	3 2 1.0	8563934
27	11 11 2.48	6 45 15.7	2040414	22 47.4	140 29 44.9	3 4 31.7	8564082
28	11 15 39.59	6 17 5.3	2049074	22 48.1	142 7 17.5	3 6 53.6	8564253
29	11 20 16.27	5 48 43.6	2057583	22 48.7	143 44 49.9	3 9 6.4	8564447
30	11 24 52.56	5 20 11.2	2065941	22 49.4	145 22 22.2	3 11 10.2	8564665
Oct. 1	11 29 28.49	4 51 28.7	2074151	22 50.0	146 59 54.3	3 13 4.7	8564904
2	11 34 4.09	4 22 37.0	2082216	22 50.7	148 37 26.0	3 14 49.8	8565167
3	11 38 39.41	3 53 36.7	2090138	22 51.3	150 14 57.3	3 16 25.6	8565452
4	11 43 14.48	3 24 28.5	2097919	22 52.0	151 52 28.1	3 17 51.9	8565760
5	11 47 49.33	2 55 13.2	2105559	22 52.6	153 29 58.4	3 19 8.6	8566089
6	11 52 24.01	2 25 51.6	2113058	22 53.2	155 7 28.0	3 20 15.8	8566441
7	11 56 58.56	1 56 24.3	2120418	22 53.9	156 44 56.8	3 21 13.3	8566681
8	12 1 33.01	1 26 52.0	2127640	22 54.5	158 22 24.7	3 22 1.1	8567207
9	12 6 7.40	0 57 15.5	2134726	22 55.1	159 59 51.7	3 22 39.2	8567622
10	12 10 41.79	0 27 35.5	2141676	22 55.8	161 37 17.7	3 23 7.5	8568056
South.							
11	12 15 16.21	0 2 7.4	2148490	22 56.4	163 14 42.5	3 23 26.1	8568511
12	12 19 50.70	0 31 52.3	2155168	22 57.0	164 52 6.1	3 23 34.9	8568985
13	12 24 25.29	1 1 38.6	2161710	22 57.6	166 29 28.5	3 23 33.9	8569478
14	12 29 0.04	1 31 25.5	2168119	22 58.3	168 6 49.5	3 23 23.1	8569990



## MEAN TIME.

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	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>9</i>
Oct. 14	12 29 00.4	1 31 25.5	2168119	22 58.3	168 6 49.5	3 23 23.1	8569990
15	12 33 34.98	2 1 12.2	2174394	22 58.9	169 44 9.0	3 23 2.6	8570521
16	12 38 10.16	2 30 58.1	2180537	22 59.6	171 21 27.0	3 22 32.4	8571069
17	12 42 45.60	3 0 42.4	2186547	23 0.2	172 58 43.4	3 21 52.4	8571635
18	12 47 21.34	3 30 24.2	2192421	23 0.9	174 35 58.1	3 21 2.8	8572218
19	12 51 57.43	4 0 2.9	2198162	23 1.6	176 13 11.0	3 20 3.6	8572817
20	12 56 33.91	4 29 37.6	2203772	23 2.2	177 50 22.1	3 18 54.8	8573432
21	13 1 10.83	4 59 7.7	2209250	23 2.9	179 27 31.3	3 17 36.6	8574064
22	13 5 48.21	5 28 32.4	2214595	23 3.6	181 4 38.5	3 16 8.9	8574710
23	13 10 26.09	5 57 50.9	2219807	23 4.3	182 41 43.6	3 14 31.8	8575370
24	13 15 4.50	6 27 2.4	2224888	23 5.0	184 18 46.7	3 12 45.6	8576045
25	13 19 43.49	6 56 6.1	2229838	23 5.7	185 55 47.5	3 10 50.1	8576733
26	13 24 23.10	7 25 1.1	2234659	23 6.5	187 32 46.2	3 8 45.7	8577435
27	13 29 3.35	7 53 46.8	2239351	23 7.2	189 9 42.5	3 6 32.2	8578148
28	13 33 44.28	8 22 22.4	2243915	23 7.9	190 46 36.5	3 4 9.9	8578873
29	13 38 25.92	8 50 47.0	2248353	23 8.7	192 23 28.1	3 1 38.9	8579610
30	13 43 8.31	9 18 59.8	2252668	23 9.5	194 0 17.2	2 58 59.4	8580357
31	13 47 51.48	9 47 0.0	2256861	23 10.3	195 37 3.8	2 56 11.4	8581114
Nov. 1	13 52 35.47	10 14 46.9	2260934	23 11.1	197 13 48.0	2 53 15.1	8581881
2	13 57 20.30	10 42 19.7	2264888	23 11.9	198 50 20.5	2 50 10.6	8582656
3	14 2 6.02	11 9 37.5	2268722	23 12.7	200 27 8.2	2 46 58.2	8583439
4	14 6 52.66	11 36 39.5	2272439	23 13.6	202 3 44.8	2 43 37.9	8584230
5	14 11 40.25	12 3 25.1	2276040	23 14.5	203 40 18.4	2 40 10.0	8585027
6	14 16 28.83	12 29 53.4	2279526	23 15.3	205 16 49.4	2 36 34.5	8585831
7	14 21 18.41	12 56 3.6	2282897	23 16.2	206 53 17.6	2 32 51.8	8586640
8	14 26 9.02	13 21 54.8	2286155	23 17.2	208 29 43.1	2 29 1.9	8587454
9	14 31 0.70	13 47 26.4	2289300	23 18.1	210 6 5.9	2 25 5.1	8588273
10	14 35 53.47	14 12 37.5	2292332	23 19.0	211 42 25.9	2 21 1.6	8589095
11	14 40 47.35	14 37 27.4	2295252	23 20.0	213 18 43.2	2 16 51.5	8589920
12	14 45 42.38	15 1 55.2	2298060	23 21.0	214 54 57.7	2 12 35.1	8590748
13	14 50 38.55	15 26 0.1	2300755	23 22.0	216 31 9.4	2 8 12.6	8591578
14	14 55 35.90	15 49 41.2	2303338	23 23.1	218 7 18.4	2 3 44.1	8592408
15	15 0 34.43	16 12 57.8	2305811	23 24.1	219 43 24.6	1 59 10.0	8593239
16	15 5 34.17	16 35 49.2	2308173	23 25.2	221 19 28.1	1 54 30.4	8594070
17	15 10 35.12	16 58 14.5	2310422	23 26.3	222 55 28.9	1 49 45.5	8594900
18	15 15 37.29	17 20 12.9	2312560	23 27.4	224 31 26.9	1 44 55.6	8595729
19	15 20 40.67	17 41 43.6	2314587	23 28.5	226 7 22.3	1 40 0.9	8596555
20	15 25 45.28	18 2 45.8	2316501	23 29.7	227 43 15.0	1 35 1.7	8597379
21	15 30 51.13	18 23 18.8	2318302	23 30.9	229 19 5.1	1 29 58.2	8598199
22	15 35 58.21	18 43 21.8	2319990	23 32.1	230 54 52.5	1 24 50.5	8599015
23	15 41 6.52	19 2 54.0	2321566	23 33.3	232 30 37.4	1 19 39.1	8599827
24	15 46 16.04	19 21 54.7	2323030	23 34.5	234 6 19.7	1 14 24.0	8600633



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	<i>Apparent Right Ascension.</i>	<i>Apparent Declination.</i>	<i>Log. of True Dist. from the Earth.</i>	<i>Meridian Passage.</i>	<i>Longitude.</i>	<i>Latitude.</i>	<i>Log. of Rad. Vect.</i>
	<i>Noon.</i>	<i>Noon.</i>	<i>Noon.</i>		<i>Noon.</i>	<i>Noon.</i>	<i>Noon.</i>
	<i>h m s</i>	<i>South. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>9</i>
Nov. 24	15 46 16.04	19 21 54.7	2323030	23 34.5	234 6 19.7	1 14 24.0	8600633
25	15 51 26.75	19 40 22.9	2324383	23 35.8	235 41 59.6	1 9 5.7	8601433
26	15 56 38.64	19 58 18.1	2325628	23 37.1	237 17 37.0	1 3 44.2	8602227
27	16 1 51.71	20 15 39.5	2326765	23 38.4	238 53 11.9	0 58 19.9	8603013
28	16 7 5.93	20 32 26.4	2327795	23 39.7	240 28 44.5	0 52 53.0	8603792
29	16 12 21.29	20 48 38.0	2328718	23 41.0	242 4 14.7	0 47 23.8	8604562
30	16 17 37.75	21 4 13.7	2329536	23 42.4	243 39 42.7	0 41 52.5	8605324
Dec. 1	16 22 55.29	21 19 12.9	2330250	23 43.7	245 15 8.4	0 36 19.3	8606076
2	16 28 13.90	21 33 34.9	2330861	23 45.1	246 50 32.0	0 30 44.6	8606818
3	16 33 33.54	21 47 19.1	2331369	23 46.5	248 25 53.5	0 25 8.7	8607549
4	16 38 54.19	22 0 24.9	2331776	23 47.9	250 1 12.9	0 19 31.6	8608269
5	16 44 15.80	22 12 51.7	2332083	23 49.3	251 36 30.4	0 13 53.8	8608978
6	16 49 38.34	22 24 39.0	2332289	23 50.8	253 11 45.9	0 8 15.4	8609674
7	16 55 1.78	22 35 46.2	2332395	23 52.3	254 46 59.6	0 2 36.8	8610358
8	17 0 26.06	22 46 12.9	2332402	23 53.8	256 22 11.4	0 3 1.9	8611028
9	17 5 51.15	22 55 58.5	2332311	23 55.2	257 57 21.6	0 8 40.3	8611684
10	17 11 16.99	23 5 2.6	2332122	23 56.7	259 32 30.1	0 14 18.2	8612326
11	17 16 43.55	23 13 24.8	2331833	23 58.3	261 7 37.0	0 19 55.4	8612954
12	17 22 10.77	23 21 4.6	2331446	23 59.8	262 42 42.4	0 25 31.5	8613566
13	17 27 38.59	23 28 1.8	2330960	* *	264 17 46.4	0 31 6.4	8614162
14	17 33 6.97	23 34 15.9	2330376	0 1.3	265 52 49.0	0 36 39.8	8614742
15	17 38 35.84	23 39 46.6	2329692	0 2.8	267 27 50.3	0 42 11.4	8615305
16	17 44 5.15	23 44 33.6	2328908	0 4.4	269 2 50.3	0 47 41.0	8615851
17	17 49 34.84	23 48 36.7	2328025	0 5.9	270 37 49.2	0 53 8.3	8616380
18	17 55 4.85	23 51 55.7	2327041	0 7.5	272 12 47.0	0 58 33.1	8616890
19	18 0 35.11	23 54 30.4	2325952	0 9.1	273 47 43.8	1 3 55.1	8617383
20	18 6 5.55	23 56 20.7	2324760	0 10.7	275 22 39.6	1 9 14.1	8617857
21	18 11 36.12	23 57 26.4	2323466	0 12.2	276 57 34.6	1 14 30.0	8618311
22	18 17 6.74	23 57 47.5	2322069	0 13.8	278 32 28.8	1 19 42.3	8618747
23	18 22 37.34	23 57 23.9	2320569	0 15.3	280 7 22.3	1 24 50.9	8619163
24	18 28 7.85	23 56 15.6	2318966	0 16.9	281 42 15.1	1 29 55.7	8619559
25	18 33 38.21	23 54 22.6	2317261	0 18.5	283 17 7.3	1 34 56.2	8619935
26	18 39 8.35	23 51 45.1	2315453	0 20.0	284 51 59.0	1 39 52.4	8620291
27	18 44 38.20	23 48 23.1	2313543	0 21.6	286 26 50.3	1 44 43.9	8620625
28	18 50 7.70	23 44 16.8	2311531	0 23.1	288 1 41.3	1 49 30.7	8620939
29	18 55 36.78	23 39 26.2	2309419	0 24.7	289 36 31.9	1 54 12.3	8621232
30	19 1 5.38	23 33 51.6	2307206	0 26.2	291 11 22.3	1 58 48.8	8621503
31	19 6 33.45	23 27 33.4	2304893	0 27.8	292 46 12.6	2 3 19.8	8621752
32	19 12 0.92	23 20 31.7	2302482	0 29.3	294 21 2.7	2 7 45.1	8621980



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	South. ° ' "	°		h m	South. ° ' "	°
Jan. 1	19 55 27.19	21 55 13.2	3644857	1 11.7	307 36 45.2	1 49 1.2	1441906
2	19 58 45.89	21 46 8.5	3647236	1 11.1	308 14 12.1	1 49 14.6	1440143
3	20 2 4.28	21 36 49.1	3649589	1 10.4	308 51 40.9	1 49 27.2	1438419
4	20 5 22.36	21 27 15.1	3651916	1 9.8	309 29 11.4	1 49 39.0	1436735
5	20 8 40.11	21 17 26.5	3654219	1 9.1	310 6 43.6	1 49 50.1	1435091
6	20 11 57.51	21 7 23.4	3656497	1 8.5	310 44 17.6	1 50 0.4	1433487
7	20 15 14.57	20 57 6.0	3658749	1 7.8	311 21 53.2	1 50 9.9	1431923
8	20 18 31.26	20 46 34.5	3660977	1 7.2	311 59 30.4	1 50 18.6	1430400
9	20 21 47.58	20 35 49.2	3663184	1 6.5	312 37 9.1	1 50 26.5	1428917
10	20 25 3.52	20 24 50.1	3665370	1 5.8	313 14 49.4	1 50 33.7	1427476
11	20 28 19.08	20 13 37.3	3667535	1 5.1	313 52 31.2	1 50 40.0	1426076
12	20 31 34.25	20 2 11.1	3669680	1 4.4	314 30 14.4	1 50 45.6	1424718
13	20 34 49.02	19 50 31.5	3671804	1 3.7	315 7 59.0	1 50 50.4	1423401
14	20 38 3.38	19 38 38.8	3673910	1 3.0	315 45 45.0	1 50 54.3	1422127
15	20 41 17.33	19 26 33.2	3676000	1 2.3	316 23 32.3	1 50 57.5	1420895
16	20 44 30.86	19 14 14.8	3678074	1 1.6	317 1 20.8	1 50 59.8	1419705
17	20 47 43.98	19 1 43.8	3680131	1 0.9	317 39 10.6	1 51 1.4	1418559
18	20 50 56.67	18 49 0.3	3682173	1 0.2	318 17 1.5	1 51 2.1	1417455
19	20 54 8.94	18 36 4.6	3684199	0 59.4	318 54 53.6	1 51 2.1	1416394
20	20 57 20.78	18 22 56.9	3686210	0 58.7	319 32 46.7	1 51 1.2	1415376
21	21 0 32.19	18 9 37.3	3688207	0 57.9	320 10 40.9	1 50 59.5	1414402
22	21 3 43.16	17 56 5.9	3690189	0 57.2	320 48 36.1	1 50 57.0	1413471
23	21 6 53.71	17 42 23.0	3692154	0 56.4	321 26 32.3	1 50 53.7	1412584
24	21 10 3.83	17 28 28.8	3694104	0 55.6	322 4 29.3	1 50 49.6	1411740
25	21 13 13.52	17 14 23.4	3696038	0 54.8	322 42 27.2	1 50 44.7	1410941
26	21 16 22.77	17 0 7.1	3697957	0 54.1	323 20 25.9	1 50 39.0	1410186
27	21 19 31.59	16 45 39.9	3699859	0 53.3	323 58 25.4	1 50 32.5	1409475
28	21 22 39.97	16 31 2.2	3701745	0 52.5	324 36 25.6	1 50 25.1	1408809
29	21 25 47.91	16 16 14.2	3703615	0 51.6	325 14 26.4	1 50 16.9	1408187
30	21 28 55.41	16 1 16.1	3705467	0 50.8	325 52 27.9	1 50 7.9	1407611
Feb. 1	21 32 2.46	15 46 8.0	3707299	0 50.0	326 30 30.0	1 49 58.1	1407078
2	21 35 9.07	15 30 50.2	3709113	0 49.2	327 8 32.5	1 49 47.5	1406591
3	21 38 15.24	15 15 22.9	3710910	0 48.3	327 46 35.6	1 49 36.1	1406148
4	21 41 20.96	14 59 46.3	3712691	0 47.5	328 24 39.1	1 49 23.9	1405751
5	21 44 26.23	14 44 0.5	3714455	0 46.6	329 2 43.0	1 49 10.9	1405398
6	21 47 31.05	14 28 5.9	3716202	0 45.8	329 40 47.2	1 48 57.1	1405091
7	21 50 35.44	14 12 2.7	3717934	0 44.9	330 18 51.7	1 48 42.4	1404829
8	21 53 39.39	13 55 51.0	3719651	0 44.0	330 56 56.4	1 48 27.0	1404612
9	21 56 42.89	13 39 31.0	3721353	0 43.1	331 35 1.3	1 48 10.8	1404441
10	21 59 45.96	13 23 3.0	3723041	0 42.2	332 13 6.4	1 47 53.7	1404315
11	22 2 48.60	13 6 27.2	3724716	0 41.3	332 51 11.6	1 47 35.9	1404234
12	22 5 50.81	12 49 43.8	3726378	0 40.4	333 29 16.8	1 47 17.3	1404199



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South. ° ' "</i>	<i>°</i>		<i>h m</i>	<i>South. ° ' "</i>	<i>°</i>
Feb. 11	22 5 50.81	12 49 43.8	.3726378	0 40.4	333 29 16.8	1 47 17.3	1404199
12	22 8 52.59	12 32 53.1	.3728025	0 39.5	334 7 22.0	1 46 57.9	1404209
13	22 11 53.95	12 15 55.2	.3729659	0 38.6	334 45 27.1	1 46 37.7	1404264
14	22 14 54.89	11 58 50.3	.3731284	0 37.7	335 23 32.2	1 46 16.7	1404365
15	22 17 55.43	11 41 38.7	.3732899	0 36.8	336 1 37.1	1 45 55.0	1404511
16	22 20 55.57	11 24 20.5	.3734502	0 35.8	336 39 41.8	1 45 32.4	1404702
17	22 23 55.31	11 6 55.9	.3736095	0 34.9	337 17 46.3	1 45 9.1	1404938
18	22 26 54.66	10 49 25.2	.3737677	0 33.9	337 55 50.4	1 44 45.1	1405220
19	22 29 53.63	10 31 48.6	.3739248	0 33.0	338 33 54.3	1 44 20.2	1405547
20	22 32 52.23	10 14 6.3	.3740808	0 32.0	339 11 57.8	1 43 54.6	1405919
21	22 35 50.47	9 56 18.4	.3742357	0 31.0	339 50 0.8	1 43 28.2	1406336
22	22 38 48.35	9 38 25.1	.3743893	0 30.0	340 28 3.3	1 43 1.1	1406798
23	22 41 45.88	9 20 26.7	.3745415	0 29.0	341 6 5.3	1 42 33.2	1407305
24	22 44 43.07	9 2 23.3	.3746923	0 28.1	341 44 6.7	1 42 4.6	1407857
25	22 47 39.92	8 44 15.3	.3748417	0 27.1	342 22 7.5	1 41 35.3	1408454
26	22 50 36.44	8 26 2.8	.3749896	0 26.1	343 0 7.7	1 41 5.2	1409095
27	22 53 32.62	8 7 46.0	.3751359	0 25.1	343 38 7.1	1 40 34.4	1409780
28	22 56 28.48	7 49 25.1	.3752806	0 24.1	344 16 5.7	1 40 2.8	1410510
Mar. 1	22 59 24.02	7 31 0.3	.3754236	0 23.0	344 54 3.6	1 39 30.6	1411284
2	23 2 19.26	7 12 31.8	.3755650	0 22.0	345 32 0.6	1 38 57.6	1412103
3	23 5 14.19	6 53 59.9	.3757048	0 21.0	346 9 56.7	1 38 23.9	1412965
4	23 8 8.81	6 35 24.8	.3758429	0 19.9	346 47 51.9	1 37 49.5	1413871
5	23 11 3.15	6 16 46.7	.3759794	0 18.9	347 25 46.0	1 37 14.4	1414821
6	23 13 57.22	5 58 5.7	.3761142	0 17.9	348 3 39.1	1 36 38.6	1415815
7	23 16 51.00	5 39 22.2	.3762473	0 16.8	348 41 31.2	1 36 2.1	1416852
8	23 19 44.49	5 20 36.3	.3763787	0 15.8	349 19 22.1	1 35 24.9	1417932
9	23 22 37.71	5 1 48.2	.3765085	0 14.7	349 57 11.9	1 34 47.1	1419055
10	23 25 30.68	4 42 58.1	.3766367	0 13.7	350 35 0.4	1 34 8.6	1420221
11	23 28 23.40	4 24 6.2	.3767633	0 12.6	351 12 47.6	1 33 29.4	1421429
12	23 31 15.89	4 5 12.8	.3768884	0 11.5	351 50 33.6	1 32 49.6	1422680
13	23 34 8.14	3 46 18.0	.3770121	0 10.5	352 28 18.2	1 32 9.1	1423972
14	23 37 0.17	3 27 22.0	.3771343	0 9.4	353 6 1.4	1 31 28.0	1425307
15	23 39 51.97	3 8 25.0	.3772550	0 8.3	353 43 43.2	1 30 46.3	1426684
16	23 42 43.56	2 49 27.3	.3773743	0 7.3	354 21 23.5	1 30 3.9	1428102
17	23 45 34.95	2 30 29.0	.3774922	0 6.2	354 59 2.2	1 29 21.0	1429562
18	23 48 26.17	2 11 30.1	.3776090	0 5.1	355 36 39.4	1 28 37.4	1431062
19	23 51 17.21	1 52 31.0	.3777242	0 4.0	356 14 15.0	1 27 53.2	1432603
20	23 54 8.08	1 33 31.9	.3778375	0 2.9	356 51 49.0	1 27 8.4	1434185
21	23 56 58.80	1 14 32.9	.3779491	0 1.8	357 29 21.2	1 26 23.0	1435807
22	23 59 49.37	0 55 34.1	.3780593	13 58.3	358 6 51.7	1 25 37.0	1437469
23	0 2 39.80	0 36 35.7	.3781678	23 58.5	358 44 20.5	1 24 50.5	1439170
24	0 5 30.11	0 17 38.0	.3782744	23 57.4	359 21 47.5	1 24 3.4	1440911



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Mar. 24	h m s 0 5 30.11	South. ° ' " 0 17 38.0	° 3782744	h m 23 57.4	° ' " 359 21 47.5	South. ° ' " 1 24 3.4	° 1440911
25	0 8 20.30	North. 0 1 18.8	3783790	23 56.2	359 59 12.6	1 23 15.7	1442691
26	0 11 10.37	0 20 14.5	3784815	23 55.1	0 36 35.8	1 22 27.5	1444510
27	0 14 0.34	0 39 9.1	3785820	23 54.0	1 13 57.1	1 21 38.7	1446368
28	0 16 50.21	0 58 2.4	3786804	23 52.9	1 51 16.4	1 20 49.4	1448264
29	0 19 39.99	1 16 54.1	3787766	23 51.8	2 28 33.8	1 19 59.6	1450198
30	0 22 29.68	1 35 44.0	3788703	23 50.7	3 54 49.1	1 19 9.2	1452169
31	0 25 19.29	1 54 31.9	3789616	23 49.6	3 43 2.3	1 18 18.3	1454178
Apr. 1	0 28 8.83	2 13 17.7	3790504	23 48.5	4 20 13.4	1 17 27.0	1456224
2	0 30 58.31	2 32 1.1	3791368	23 47.4	4 57 22.4	1 16 35.1	1458307
3	0 33 47.73	2 50 42.0	3792206	23 46.2	5 34 29.2	1 15 42.7	1460426
4	0 36 37.10	3 9 20.2	3793020	23 45.1	6 11 33.8	1 14 49.9	1462580
5	0 39 26.42	3 27 55.5	3793810	23 44.0	6 48 36.2	1 13 56.6	1464771
6	0 42 15.70	3 46 27.7	3794576	23 42.9	7 25 36.2	1 13 2.9	1466997
7	0 45 4.95	4 4 56.8	3795316	23 41.7	8 2 34.0	1 12 8.7	1469258
8	0 47 54.18	4 23 22.5	3796030	23 40.6	8 39 29.4	1 11 14.0	1471553
9	0 50 43.39	4 41 44.5	3796720	23 39.5	9 16 22.4	1 10 18.9	1473883
10	0 53 32.58	5 0 2.8	3797384	23 38.4	9 53 13.0	1 9 23.4	1476246
11	0 56 21.77	5 18 17.1	3798024	23 37.3	10 30 1.2	1 8 27.5	1478644
12	0 59 10.97	5 36 27.3	3798638	23 36.1	11 6 46.8	1 7 31.2	1481074
13	1 2 0.18	5 54 33.2	3799228	23 35.0	11 43 30.0	1 6 34.5	1483537
14	1 4 49.41	6 12 34.7	3799792	23 33.9	12 20 10.7	1 5 37.4	1486033
15	1 7 38.66	6 30 31.6	3800331	23 32.8	12 56 48.7	1 4 39.9	1488560
16	1 10 27.96	6 48 23.8	3800846	23 31.7	13 33 24.2	1 3 42.0	1491119
17	1 13 17.32	7 6 11.1	3801337	23 30.5	14 9 57.1	1 2 43.8	1493710
18	1 16 6.73	7 23 53.4	3801801	23 29.4	14 46 27.3	1 1 45.2	1496331
19	1 18 56.20	7 41 30.6	3802239	23 28.3	15 22 54.9	1 0 46.3	1498983
20	1 21 45.74	7 59 2.5	3802647	23 27.2	15 59 19.7	0 59 47.0	1501665
21	1 24 35.37	8 16 28.9	3803021	23 26.1	16 35 41.8	0 58 47.4	1504377
22	1 27 25.09	8 33 49.6	3803364	23 25.0	17 12 1.2	0 57 47.5	1507118
23	1 30 14.90	8 51 4.6	3803677	23 23.8	17 48 17.7	0 56 47.3	1509888
24	1 33 4.80	9 8 13.7	3803958	23 22.7	18 24 31.5	0 55 46.7	1512686
25	1 35 54.80	9 25 16.6	3804205	23 21.6	19 0 42.4	0 54 45.9	1515513
26	1 38 44.90	9 42 13.2	3804416	23 20.5	19 36 50.5	0 53 44.8	1518367
27	1 41 35.11	9 59 3.4	3804591	23 19.4	20 12 55.7	0 52 43.4	1521248
28	1 44 25.44	10 15 47.1	3804730	23 18.3	20 48 58.0	0 51 41.8	1524156
29	1 47 15.88	10 32 24.0	3804833	23 17.2	21 24 57.4	0 50 39.9	1527091
30	1 50 6.44	10 48 54.1	3804898	23 16.1	22 0 53.8	0 49 37.7	1530052
May 1	1 52 57.13	11 5 17.1	3804924	23 15.1	22 36 47.2	0 48 35.3	1533038
2	1 55 47.95	11 21 33.0	3804911	23 14.0	23 12 37.7	0 47 32.7	1536050
3	1 58 38.90	11 37 41.5	3804858	23 12.9	23 48 25.2	0 46 29.9	1539086
4	2 1 29.99	11 53 42.5	3804765	23 11.8	24 24 9.6	0 45 26.8	1542147



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.			
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.	
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	
<div>North.</div> <div>° ' "</div> <div>°</div>								
<div>h m s</div> <div>h m</div> <div>° ' "</div> <div>°</div>								
May	4	2 1 29.99	11 53 42.5	.3804765	23 11.8	24 24 9.6	0 45 26.8	.1542147
	5	2 4 21.21	12 9 35.9	.3804632	23 10.7	24 59 51.0	0 44 23.5	.1545232
	6	2 7 12.57	12 25 21.6	.3804460	23 9.6	25 35 29.3	0 43 20.1	.1548340
	7	2 10 4.07	12 40 59.3	.3804248	23 8.5	26 11 4.5	0 42 16.4	.1551471
	8	2 12 55.72	12 56 29.0	.3803995	23 7.4	26 46 36.6	0 41 12.6	.1554625
	9	2 15 47.51	13 11 50.5	.3803701	23 6.3	27 22 5.6	0 40 8.6	.1557801
	10	2 18 39.45	13 27 3.6	.3803366	23 5.3	27 57 31.5	0 39 4.4	.1561000
	11	2 21 31.55	13 42 8.3	.3802992	23 4.2	28 32 54.3	0 38 0.1	.1564219
	12	2 24 23.80	13 57 4.3	.3802578	23 3.1	29 8 13.8	0 36 55.6	.1567460
	13	2 27 16.22	14 11 51.6	.3802124	23 2.1	29 43 30.2	0 35 51.0	.1570721
	14	2 30 8.81	14 26 30.0	.3801629	23 1.0	30 18 43.4	0 34 46.3	.1574002
	15	2 33 1.57	14 40 59.5	.3801093	23 0.0	30 53 53.4	0 33 41.5	.1577303
	16	2 35 54.51	14 55 20.0	.3800515	22 58.9	31 29 0.1	0 32 36.5	.1580624
	17	2 38 47.63	15 9 31.3	.3799891	22 57.9	32 4 3.6	0 31 31.4	.1583963
	18	2 41 40.93	15 23 33.3	.3799223	22 56.8	32 39 3.9	0 30 26.3	.1587321
	19	2 44 34.41	15 37 25.9	.3798512	22 55.8	33 14 0.9	0 29 21.0	.1590696
	20	2 47 28.08	15 51 9.0	.3797754	22 54.7	33 48 54.6	0 28 15.7	.1594090
	21	2 50 21.94	16 4 42.5	.3796947	22 53.7	34 23 45.0	0 27 10.3	.1597501
	22	2 53 15.98	16 18 6.3	.3796091	22 52.6	34 58 32.2	0 26 4.8	.1600928
	23	2 56 10.21	16 31 20.2	.3795183	22 51.6	35 33 16.0	0 24 59.3	.1604372
	24	2 59 4.62	16 44 24.0	.3794224	22 50.6	36 7 56.5	0 23 53.7	.1607831
25	3 1 59.22	16 57 17.7	.3793215	22 49.6	36 42 33.7	0 22 48.1	.1611307	
26	3 4 54.01	17 10 1.2	.3792153	22 48.5	37 17 7.6	0 21 42.5	.1614797	
27	3 7 48.97	17 22 34.4	.3791033	22 47.5	37 51 38.1	0 20 36.8	.1618302	
28	3 10 44.11	17 34 57.2	.3789858	22 46.5	38 26 5.2	0 19 31.1	.1621821	
29	3 13 39.43	17 47 9.4	.3788629	22 45.5	39 0 29.0	0 18 25.4	.1625354	
30	3 16 34.93	17 59 11.0	.3787344	22 44.4	39 34 49.5	0 17 19.7	.1628900	
31	3 19 30.60	18 11 1.7	.3786001	22 43.4	40 9 6.5	0 16 14.1	.1632460	
June	1	3 22 26.43	18 22 41.6	.3784599	22 42.4	40 43 20.2	0 15 8.4	.1636032
	2	3 25 22.43	18 34 10.7	.3783138	22 41.4	41 17 30.5	0 14 2.7	.1639616
3	3 28 18.59	18 45 28.7	.3781619	22 40.4	41 51 37.4	0 12 57.0	.1643212	
4	3 31 14.90	18 56 35.5	.3780042	22 39.4	42 25 40.9	0 11 51.4	.1646819	
5	3 34 11.36	19 7 31.0	.3778406	22 38.4	42 59 41.0	0 10 45.9	.1650437	
6	3 37 7.97	19 18 15.1	.3776710	22 37.4	43 33 37.7	0 9 40.4	.1654066	
7	3 40 4.72	19 28 47.8	.3774955	22 36.4	44 7 31.0	0 8 34.9	.1657705	
8	3 43 1.62	19 39 9.1	.3773143	22 35.4	44 41 20.9	0 7 29.5	.1661354	
9	3 45 58.65	19 49 18.7	.3771272	22 34.4	45 15 7.4	0 6 24.1	.1665012	
10	3 48 55.82	19 59 16.5	.3769338	22 33.5	45 48 50.4	0 5 18.9	.1668678	
11	3 51 53.12	20 9 2.6	.3767344	22 32.5	46 22 30.1	0 4 13.7	.1672354	
12	3 54 50.56	20 18 37.0	.3765291	22 31.5	46 56 6.3	0 3 8.6	.1676037	
13	3 57 48.14	20 27 59.6	.3763177	22 30.5	47 29 39.1	0 2 3.6	.1679729	
14	4 0 45.84	20 37 10.2	.3761000	22 29.5	48 3 8.5	0 0 58.7	.1683427	



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
June 14	h m s 4 045.84	North. ° ' " 20 37 10.2	° 3761000	h m 22 29.5	° ' " 48 3 8.5	South. ° ' " 0 58.7	° 1683427
15	4 343.66	20 46 8.8	3758760	22 28.5	48 36 34.5	0 6.1	1687133
16	4 641.60	20 54 55.5	3756456	22 27.6	49 9 57.1	0 110.8	1690845
17	4 939.65	21 3 30.1	3754086	22 26.6	49 43 16.2	0 215.4	1694563
18	4 1237.81	21 11 52.5	3751650	22 25.6	50 16 31.9	0 319.9	1698287
19	4 1536.08	21 20 2.7	3749145	22 24.7	50 49 44.2	0 424.2	1702017
20	4 1834.45	21 28 0.6	3746570	22 23.7	51 22 53.1	0 528.4	1705752
21	4 2132.90	21 35 46.2	3743925	22 22.7	51 55 58.5	0 632.4	1709491
22	4 2431.44	21 43 19.5	3741208	22 21.7	52 29 0.6	0 736.3	1713234
23	4 2730.05	21 50 40.4	3738417	22 20.8	53 1 59.2	0 840.1	1716982
24	4 3028.73	21 57 48.8	3735551	22 19.8	53 34 54.4	0 943.7	1720733
25	4 3327.47	22 4 44.7	3732610	22 18.9	54 7 46.2	0 1047.1	1724487
26	4 3626.26	22 11 28.0	3729595	22 17.9	54 40 34.6	0 1150.3	1728244
27	4 3925.10	22 17 58.8	3726503	22 16.9	55 13 19.6	0 1253.4	1732004
28	4 4223.97	22 24 17.0	3723332	22 16.0	55 46 1.3	0 1356.3	1735766
29	4 4522.85	22 30 22.6	3720081	22 15.0	56 18 39.5	0 1459.0	1739529
30	4 4821.74	22 36 15.5	3716750	22 14.1	56 51 14.3	0 161.6	1743294
July 1	4 5120.64	22 41 55.7	3713340	22 13.1	57 23 45.8	0 173.9	1747060
2	4 5419.53	22 47 23.2	3709851	22 12.2	57 56 13.9	0 186.0	1750827
3	4 5718.40	22 52 37.9	3706283	22 11.2	58 28 38.6	0 198.0	1754593
4	5 017.24	22 57 39.9	3702634	22 10.2	59 0 59.9	0 209.7	1758360
5	5 316.04	23 2 29.1	3698904	22 9.3	59 33 17.9	0 2111.2	1762127
6	5 614.80	23 7 5.5	3695092	22 8.3	60 5 32.6	0 2212.5	1765893
7	5 913.51	23 11 29.1	3691199	22 7.3	60 37 43.8	0 2313.6	1769658
8	5 1212.15	23 15 39.8	3687225	22 6.4	61 9 51.8	0 2414.4	1773421
9	5 1510.73	23 19 37.8	3683169	22 5.4	61 41 56.4	0 2515.0	1777183
10	5 189.24	23 23 23.1	3679030	22 4.4	62 13 57.7	0 2615.4	1780943
11	5 217.66	23 26 55.7	3674809	22 3.5	62 45 55.7	0 2715.6	1784701
12	5 246.00	23 30 15.5	3670507	22 2.5	63 17 50.4	0 2815.4	1788456
13	5 274.24	23 33 22.5	3666121	22 1.5	63 49 41.8	0 2915.1	1792208
14	5 302.37	23 36 16.8	3661646	22 0.5	64 21 29.9	0 3014.5	1795957
15	5 330.39	23 38 58.5	3657084	21 59.5	64 53 14.7	0 3113.6	1799702
16	5 3558.29	23 41 27.6	3652435	21 58.6	65 24 56.3	0 3212.5	1803443
17	5 3856.06	23 43 44.0	3647697	21 57.6	65 56 34.5	0 3311.1	1807180
18	5 4153.69	23 45 47.8	3642866	21 56.6	66 28 9.6	0 349.5	1810913
19	5 4451.18	23 47 39.0	3637942	21 55.6	66 59 41.4	0 357.5	1814640
20	5 4748.50	23 49 17.6	3632925	21 54.7	67 31 9.9	0 365.3	1818363
21	5 5045.66	23 50 43.7	3627812	21 53.7	68 2 35.3	0 372.8	1822080
22	5 5342.64	23 51 57.3	3622602	21 52.6	68 33 57.4	0 380.0	1825792
23	5 5639.43	23 52 58.5	3617295	21 51.6	69 5 16.3	0 3857.0	1829497
24	5 5936.02	23 53 47.2	3611889	21 50.6	69 36 32.0	0 3953.6	1833196
25	6 232.40	23 54 23.6	3606384	21 49.6	70 7 44.6	0 4050.0	1836889



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>°</i>
July 25	6 23 2.40	23 54 23.6	3606384	21 49.6	70 7 44.6	0 40 50.0	1836889
26	6 5 28.56	23 54 47.7	3600777	21 48.6	70 38 54.0	0 41 46.1	1840575
27	6 8 24.48	23 54 59.6	3595067	21 47.6	71 10 0.2	0 42 41.8	1844253
28	6 11 20.16	23 54 59.4	3589255	21 46.6	71 41 3.3	0 43 37.2	1847924
29	6 14 15.58	23 54 47.0	3583339	21 45.6	72 12 3.2	0 44 32.4	1851588
30	6 17 10.74	23 54 22.4	3577319	21 44.6	72 43 0.1	0 45 27.2	1855243
Aug. 1	6 20 5.61	23 53 45.8	3571196	21 43.5	73 13 53.8	0 46 21.7	1858890
2	6 23 0.19	23 52 57.3	3564969	21 42.5	73 44 44.4	0 47 15.9	1862529
3	6 25 54.47	23 51 56.8	3558637	21 41.4	74 15 32.0	0 48 9.8	1866159
4	6 28 48.45	23 50 44.4	3552199	21 40.4	74 46 16.4	0 49 3.4	1869780
5	6 31 42.11	23 49 20.3	3545657	21 39.3	75 16 57.9	0 49 56.6	1873391
6	6 34 35.45	23 47 44.5	3539010	21 38.3	75 47 36.2	0 50 49.5	1876993
7	6 37 28.47	23 45 57.2	3532258	21 37.2	76 18 11.6	0 51 42.1	1880585
8	6 40 21.15	23 43 58.4	3525396	21 36.1	76 48 43.9	0 52 34.4	1884167
9	6 43 13.49	23 41 48.1	3518426	21 35.1	77 19 13.3	0 53 26.3	1887739
10	6 46 5.48	23 39 26.5	3511350	21 34.0	77 49 39.6	0 54 17.9	1891300
11	6 48 57.11	23 36 53.6	3504166	21 32.9	78 20 3.0	0 55 9.1	1894850
12	6 51 48.39	23 34 9.5	3496872	21 31.8	78 50 23.4	0 56 0.0	1898390
13	6 54 39.30	23 31 14.4	3489466	21 30.7	79 20 40.9	0 56 50.6	1901918
14	6 57 29.84	23 28 8.3	3481947	21 29.6	79 50 55.4	0 57 40.8	1905434
15	7 0 20.00	23 24 51.3	3474313	21 28.5	80 21 7.0	0 58 30.7	1908939
16	7 3 9.79	23 21 23.4	3466564	21 27.4	80 51 15.7	0 59 20.2	1912432
17	7 5 59.18	23 17 44.7	3458697	21 26.3	81 21 21.6	1 0 9.3	1915912
18	7 8 48.17	23 13 55.5	3450711	21 25.1	81 51 24.5	1 0 58.2	1919380
19	7 11 36.76	23 9 55.8	3442605	21 24.0	82 21 24.6	1 1 46.6	1922836
20	7 14 24.93	23 5 45.6	3434376	21 22.8	82 51 21.8	1 2 34.7	1926279
21	7 17 12.69	23 1 25.1	3426024	21 21.7	83 21 16.2	1 3 22.4	1929708
22	7 20 0.02	22 56 54.4	3417548	21 20.5	83 51 7.8	1 4 9.8	1933124
23	7 22 46.92	22 52 13.6	3408946	21 19.4	84 20 56.6	1 4 56.8	1936527
24	7 25 33.38	22 47 22.9	3400217	21 18.2	84 50 42.6	1 5 43.4	1939916
25	7 28 19.39	22 42 22.3	3391359	21 17.0	85 20 25.9	1 6 29.7	1943291
26	7 31 4.94	22 37 12.0	3382371	21 15.8	85 50 6.4	1 7 15.6	1946652
27	7 33 50.03	22 31 52.0	3373254	21 14.6	86 19 44.1	1 8 1.1	1949999
28	7 36 34.64	22 26 22.5	3364007	21 13.4	86 49 19.2	1 8 46.3	1953331
29	7 39 18.76	22 20 43.6	3354629	21 12.2	87 18 51.5	1 9 31.1	1956648
30	7 42 2.41	22 14 55.2	3345117	21 11.0	87 48 21.2	1 10 15.5	1959951
Sept. 1	7 44 45.56	22 8 57.6	3335472	21 9.8	88 17 48.2	1 10 59.5	1963238
2	7 47 28.22	22 2 51.1	3325606	21 8.5	88 47 12.5	1 11 43.2	1966510
3	7 50 10.37	21 56 35.7	3315786	21 7.3	89 16 34.3	1 12 26.4	1969767
4	7 52 52.02	21 50 11.5	3305741	21 6.0	89 45 53.4	1 13 9.3	1973008
5	7 55 33.16	21 43 38.6	3295562	21 4.8	90 15 9.8	1 13 51.9	1976233
6	7 58 13.80	21 36 57.0	3285249	21 3.5	90 44 23.7	1 14 34.0	1979442



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div> <div>h m s</div> <div>North.</div> <div>° ' "</div> </div> <div> <div>° ' "</div> <div>°</div> </div> </div>							
Sept. 4	7 58 13.80	21 36 57.0	3285249	21 3.5	90 44 23.7	1 14 34.0	1979442
5	8 0 53.93	21 30 7.0	3274801	21 2.2	91 13 35.1	1 15 15.7	1982634
6	8 3 33.54	21 23 8.9	3264219	21 0.9	91 42 43.9	1 15 57.1	1985811
7	8 6 12.64	21 16 2.5	3253501	20 59.6	92 11 50.1	1 16 38.1	1988971
8	8 8 51.23	21 8 47.9	3242643	20 58.3	92 40 53.8	1 17 18.7	1992114
9	8 11 29.31	21 1 25.4	3231645	20 57.0	93 9 55.1	1 17 58.9	1995240
10	8 14 6.86	20 53 55.1	3220506	20 55.7	93 38 53.8	1 18 38.7	1998349
11	8 16 43.89	20 46 17.1	3209225	20 54.3	94 7 50.1	1 19 18.1	2001441
12	8 19 20.41	20 38 31.5	3197799	20 53.0	94 36 43.9	1 19 57.1	2004515
13	8 21 56.41	20 30 38.4	3186227	20 51.6	95 5 35.3	1 20 35.7	2007572
14	8 24 31.88	20 22 38.0	3174505	20 50.3	95 34 24.3	1 21 14.0	2010611
15	8 27 6.83	20 14 30.4	3162633	20 48.9	96 3 10.9	1 21 51.8	2013632
16	8 29 41.25	20 6 15.8	3150613	20 47.6	96 31 55.1	1 22 29.3	2016636
17	8 32 15.13	19 57 54.2	3138440	20 46.2	97 0 36.9	1 23 6.3	2019621
18	8 34 48.48	19 49 25.8	3126110	20 44.8	97 29 16.4	1 23 42.9	2022587
19	8 37 21.30	19 40 50.8	3113624	20 43.4	97 57 53.6	1 24 19.2	2025535
20	8 39 53.58	19 32 9.3	3100981	20 42.0	98 26 28.4	1 24 55.0	2028465
21	8 42 25.31	19 23 21.4	3088179	20 40.6	98 55 1.0	1 25 30.5	2031375
22	8 44 56.49	19 14 27.3	3075215	20 39.1	99 23 31.3	1 26 5.5	2034267
23	8 47 27.12	19 5 27.0	3062090	20 37.7	99 51 59.3	1 26 40.2	2037140
24	8 49 57.19	18 56 20.7	3048805	20 36.2	100 20 25.1	1 27 14.5	2039994
25	8 52 26.70	18 47 8.6	3035356	20 34.8	100 48 48.7	1 27 48.3	2042828
26	8 54 55.65	18 37 50.8	3021741	20 33.3	101 17 10.1	1 28 21.8	2045642
27	8 57 24.03	18 28 27.5	3009661	20 31.8	101 45 29.3	1 28 54.8	2048437
28	8 59 51.84	18 18 58.7	2994016	20 30.4	102 13 46.3	1 29 27.4	2051213
29	9 2 19.09	18 9 24.7	2979905	20 28.9	102 42 1.2	1 29 59.7	2053968
30	9 4 45.77	17 59 45.5	2965628	20 27.3	103 10 14.0	1 30 31.5	2056704
Oct. 1	9 7 11.88	17 50 1.4	2951185	20 25.8	103 38 24.6	1 31 2.9	2059419
2	9 9 37.43	17 40 12.5	2936575	20 24.3	104 6 33.2	1 31 34.0	2062114
3	9 12 2.41	17 30 18.9	2921798	20 22.8	104 34 39.7	1 32 4.6	2064789
4	9 14 26.82	17 20 20.6	2906851	20 21.2	105 2 44.1	1 32 34.8	2067443
5	9 16 50.67	17 10 17.8	2891734	20 19.7	105 30 46.5	1 33 4.6	2070077
6	9 19 13.96	17 0 10.7	2876447	20 18.1	105 58 46.9	1 33 34.0	2072690
7	9 21 36.69	16 49 59.4	2860987	20 16.6	106 26 45.2	1 34 3.0	2075282
8	9 23 58.86	16 39 44.0	2845352	20 15.0	106 54 41.6	1 34 31.6	2077853
9	9 26 20.48	16 29 24.7	2829541	20 13.4	107 22 36.1	1 34 59.7	2080403
10	9 28 41.54	16 19 1.5	2813551	20 11.8	107 50 28.5	1 35 27.5	2082932
11	9 31 2.05	16 8 34.6	2797382	20 10.2	108 18 19.1	1 35 54.8	2085440
12	9 33 21.99	15 58 4.2	2781031	20 8.6	108 46 7.7	1 36 21.8	2087927
13	9 35 41.38	15 47 30.4	2764496	20 7.0	109 13 54.5	1 36 48.3	2090392
14	9 38 0.21	15 36 53.3	2747773	20 5.3	109 41 39.4	1 37 14.4	2092835
15	9 40 18.49	15 26 13.0	2730863	20 3.7	110 9 22.4	1 37 40.2	2095257



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	North.		°		North.		°
	h m s	° ' "			h m	° ' "	
Oct. 15	9 40 18.49	15 26 13.0	.2730863	20 3.7	110 9 22.4	1 37 40.2	.2095257
16	9 42 36.21	15 15 29.7	.2713765	20 2.0	110 37 3.6	1 38 5.5	.2097657
17	9 44 53.36	15 4 43.5	.2696475	20 0.4	111 4 43.0	1 38 30.4	.2100035
18	9 47 9.95	14 53 54.7	.2678991	19 58.7	111 32 20.6	1 38 54.9	.2102391
19	9 49 25.98	14 43 3.3	.2661311	19 57.0	111 59 56.4	1 39 19.0	.2104725
20	9 51 41.43	14 32 9.4	.2643435	19 55.3	112 27 30.4	1 39 42.7	.2107038
21	9 53 56.30	14 21 13.1	.2625362	19 53.6	112 55 2.8	1 40 5.9	.2109327
22	9 56 10.61	14 10 14.7	.2607090	19 51.9	113 22 33.3	1 40 28.8	.2111595
23	9 58 24.33	13 59 14.4	.2588618	19 50.2	113 50 2.2	1 40 51.3	.2113840
24	10 0 37.46	13 48 12.3	.2569942	19 48.5	114 17 29.4	1 41 13.3	.2116062
25	10 2 50.01	13 37 8.5	.2551062	19 46.7	114 44 55.0	1 41 34.9	.2118262
26	10 5 1.97	13 26 3.1	.2531979	19 44.9	115 12 18.8	1 41 56.2	.2120439
27	10 7 13.34	13 14 56.2	.2512693	19 43.2	115 39 41.1	1 42 17.0	.2122594
28	10 9 24.11	13 3 48.1	.2493202	19 41.4	116 7 1.7	1 42 37.4	.2124725
29	10 11 34.29	12 52 38.9	.2473507	19 39.6	116 34 20.8	1 42 57.4	.2126834
30	10 13 43.88	12 41 28.7	.2453607	19 37.8	117 1 38.3	1 43 17.0	.2128919
31	10 15 52.87	12 30 17.7	.2433502	19 36.0	117 28 54.2	1 43 36.2	.2130982
Nov. 1	10 18 1.28	12 19 5.9	.2413193	19 34.2	117 56 8.6	1 43 54.9	.2133021
2	10 20 9.09	12 7 53.5	.2392675	19 32.4	118 23 21.5	1 44 13.3	.2135037
3	10 22 16.31	11 56 40.6	.2371946	19 30.6	118 50 32.9	1 44 31.2	.2137029
4	10 24 22.93	11 45 27.4	.2351005	19 28.8	119 17 42.8	1 44 48.8	.2138998
5	10 26 28.96	11 34 14.0	.2329854	19 26.9	119 44 51.2	1 45 5.9	.2140944
6	10 28 34.40	11 23 0.5	.2308489	19 25.1	120 11 58.2	1 45 22.7	.2142866
7	10 30 39.25	11 11 47.0	.2286903	19 23.2	120 39 3.8	1 45 39.0	.2144765
8	10 32 43.50	11 0 33.6	.2265099	19 21.3	121 6 8.0	1 45 54.9	.2146639
9	10 34 47.15	10 49 20.5	.2243079	19 19.4	121 33 10.8	1 46 10.4	.2148491
10	10 36 50.20	10 38 7.8	.2220835	19 17.5	122 0 12.2	1 46 25.5	.2150318
11	10 38 52.65	10 26 55.8	.2198361	19 15.6	122 27 12.3	1 46 40.2	.2152122
12	10 40 54.49	10 15 44.6	.2175660	19 13.7	122 54 11.0	1 46 54.5	.2153901
13	10 42 55.72	10 4 34.2	.2152732	19 11.8	123 21 8.5	1 47 8.4	.2155657
14	10 44 56.32	9 53 24.7	.2129574	19 9.8	123 48 4.7	1 47 21.9	.2157389
15	10 46 56.30	9 42 16.4	.2106181	19 7.9	124 14 59.5	1 47 35.0	.2159097
16	10 48 55.65	9 31 9.4	.2082554	19 5.9	124 41 53.2	1 47 47.6	.2160780
17	10 50 54.36	9 20 3.9	.2058690	19 4.0	125 8 45.6	1 47 59.9	.2162440
18	10 52 52.42	9 9 0.1	.2034588	19 2.0	125 35 36.7	1 48 11.8	.2164075
19	10 54 49.83	8 57 58.0	.2010246	19 0.0	126 2 26.7	1 48 23.2	.2165686
20	10 56 46.57	8 46 57.8	.1985664	18 58.0	126 29 15.5	1 48 34.3	.2167272
21	10 58 42.65	8 35 59.6	.1960839	18 56.0	126 56 3.2	1 48 45.0	.2168834
22	11 0 38.05	8 25 3.7	.1935770	18 54.0	127 22 49.7	1 48 55.2	.2170371
23	11 2 32.75	8 14 10.3	.1910453	18 51.9	127 49 35.1	1 49 5.0	.2171884
24	11 4 26.76	8 3 19.4	.1884890	18 49.9	128 16 19.4	1 49 14.5	.2173372
25	11 6 20.07	7 52 31.3	.1859083	18 47.8	128 43 2.5	1 49 23.5	.2174835



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>°</i>
Nov. 25	11 6 20.07	7 52 31.3	.1859083	18 47.8	128 43 2.5	1 49 23.5	.2174835
26	11 8 12.66	7 41 46.0	.1833032	18 45.7	129 9 44.7	1 49 32.2	.2176274
27	11 10 4.53	7 31 3.8	.1806740	18 43.7	129 36 25.7	1 49 40.4	.2177688
28	11 11 55.67	7 20 24.8	.1780204	18 41.6	130 3 5.8	1 49 48.2	.2179077
29	11 13 46.10	7 9 48.9	.1753421	18 39.4	130 29 44.8	1 49 55.7	.2180442
30	11 15 35.79	6 59 16.5	.1726391	18 37.3	130 56 22.9	1 50 2.7	.2181781
Dec. 1	11 17 24.74	6 48 47.7	.1699116	18 35.2	131 22 59.9	1 50 9.3	.2183096
2	11 19 12.93	6 38 22.6	.1671593	18 33.0	131 49 36.0	1 50 15.5	.2184385
3	11 21 0.37	6 28 1.3	.1643820	18 30.9	132 16 11.2	1 50 21.4	.2185650
4	11 22 47.05	6 17 44.0	.1615796	18 28.7	132 42 45.5	1 50 26.8	.2186889
5	11 24 32.96	6 7 30.9	.1587517	18 26.5	133 9 18.9	1 50 31.8	.2188103
6	11 26 18.08	5 57 22.0	.1558982	18 24.3	133 35 51.4	1 50 36.5	.2189293
7	11 28 2.41	5 47 17.4	.1530187	18 22.1	134 2 23.0	1 50 40.7	.2190457
8	11 29 45.93	5 37 17.4	.1501135	18 19.9	134 28 53.8	1 50 44.6	.2191596
9	11 31 28.64	5 27 22.1	.1471828	18 17.7	134 55 23.8	1 50 48.0	.2192710
10	11 33 10.52	5 17 31.7	.1442258	18 15.4	135 21 52.9	1 50 51.1	.2193798
11	11 34 51.56	5 7 46.3	.1412420	18 13.2	135 48 21.3	1 50 53.7	.2194861
12	11 36 31.75	4 58 6.1	.1382318	18 10.9	136 14 48.9	1 50 56.0	.2195899
13	11 38 11.06	4 48 31.2	.1351955	18 8.6	136 41 15.8	1 50 57.9	.2196912
14	11 39 49.47	4 39 1.8	.1321325	18 6.2	137 7 41.9	1 50 59.3	.2197899
15	11 41 26.98	4 29 38.2	.1290425	18 3.9	137 34 7.4	1 51 0.4	.2198861
16	11 43 3.56	4 20 20.6	.1259256	18 1.6	138 0 32.1	1 51 1.1	.2199797
17	11 44 39.20	4 11 9.0	.1227818	17 59.2	138 26 56.2	1 51 1.4	.2200708
18	11 46 13.87	4 2 3.7	.1196110	17 56.9	138 53 19.6	1 51 1.3	.2201593
19	11 47 47.54	3 53 4.8	.1164127	17 54.5	139 19 42.3	1 51 0.8	.2202453
20	11 49 20.19	3 44 12.6	.1131874	17 52.1	139 46 4.5	1 50 59.9	.2203287
21	11 50 51.82	3 35 27.3	.1099353	17 49.7	140 12 26.0	1 50 58.6	.2204096
22	11 52 22.39	3 26 49.0	.1066566	17 47.2	140 38 47.0	1 50 57.0	.2204879
23	11 53 51.89	3 18 17.9	.1033512	17 44.7	141 5 7.4	1 50 54.9	.2205636
24	11 55 20.29	3 9 54.3	.1000195	17 42.3	141 31 27.3	1 50 52.5	.2206368
25	11 56 47.58	3 1 38.2	.0966621	17 39.8	141 57 46.6	1 50 49.6	.2207074
26	11 58 13.73	2 53 29.9	.0932788	17 37.3	142 24 5.5	1 50 46.4	.2207755
27	11 59 38.73	2 45 29.5	.0898698	17 34.7	142 50 23.8	1 50 42.8	.2208409
28	12 1 2.56	2 37 37.2	.0864351	17 32.2	143 16 41.7	1 50 38.8	.2209038
29	12 2 25.19	2 29 53.1	.0829750	17 29.6	143 42 59.1	1 50 34.4	.2209641
30	12 3 46.60	2 22 17.4	.0794895	17 27.0	144 9 16.1	1 50 29.7	.2210218
31	12 5 6.78	2 14 50.3	.0759785	17 24.4	144 35 32.7	1 50 24.5	.2210770
32	12 6 25.69	2 7 32.0	.0724423	17 21.7	145 1 48.9	1 50 19.0	.2211295



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
		North.	°		South.		°
Jan. 1	h m s 2 35 44.69	° ' " 14 5 32.7	° 6466169	h m 7 50.7	° ' " 50 49 0.1	° ' " 0 58 40.2	° 6987687
2	2 35 41.66	14 5 37.2	6479958	7 46.7	50 54 24.1	0 58 35.2	6987881
3	2 35 39.46	14 5 45.6	6493837	7 42.8	50 59 48.0	0 58 30.3	6988074
4	2 35 38.08	14 5 58.0	6507800	7 38.8	51 5 11.9	0 58 25.3	6988268
5	2 35 37.52	14 6 14.3	6521841	7 34.9	51 10 35.8	0 58 20.4	6988463
6	2 35 37.79	14 6 34.4	6535955	7 31.0	51 15 59.7	0 58 15.4	6988658
7	2 35 38.88	14 6 58.5	6550135	7 27.0	51 21 23.5	0 58 10.4	6988853
8	2 35 40.79	14 7 26.4	6564377	7 23.1	51 26 47.3	0 58 5.4	6989049
9	2 35 43.52	14 7 58.2	6578673	7 19.3	51 32 11.1	0 58 0.4	6989245
10	2 35 47.06	14 8 33.9	6593020	7 15.4	51 37 34.8	0 57 55.4	6989441
11	2 35 51.41	14 9 13.3	6607410	7 11.5	51 42 58.5	0 57 50.4	6989638
12	2 35 56.57	14 9 56.6	6621840	7 7.7	51 48 22.2	0 57 45.4	6989835
13	2 36 2.53	14 10 43.6	6636305	7 3.9	51 53 45.8	0 57 40.3	6990033
14	2 36 9.29	14 11 34.3	6650799	7 0.1	51 59 9.4	0 57 35.3	6990231
15	2 36 16.85	14 12 28.7	6665316	6 56.3	52 4 33.0	0 57 30.3	6990429
16	2 36 25.19	14 13 26.8	6679854	6 52.5	52 9 56.5	0 57 25.2	6990628
17	2 36 34.32	14 14 28.5	6694406	6 48.7	52 15 20.0	0 57 20.1	6990827
18	2 36 44.24	14 15 33.8	6708970	6 44.9	52 20 43.5	0 57 15.1	6991026
19	2 36 54.93	14 16 42.6	6723542	6 41.2	52 26 7.0	0 57 10.0	6991226
20	2 37 6.40	14 17 55.0	6738115	6 37.4	52 31 30.4	0 57 4.9	6991426
21	2 37 18.63	14 19 10.9	6752688	6 33.7	52 36 53.8	0 56 59.8	6991627
22	2 37 31.63	14 20 30.2	6767256	6 30.0	52 42 17.1	0 56 54.7	6991828
23	2 37 45.39	14 21 52.9	6781814	6 26.3	52 47 40.4	0 56 49.6	6992029
24	2 37 59.90	14 23 19.1	6796359	6 22.6	52 53 3.7	0 56 44.5	6992230
25	2 38 15.17	14 24 48.5	6810887	6 18.9	52 58 27.0	0 56 39.4	6992432
26	2 38 31.18	14 26 21.3	6825394	6 15.3	53 3 50.2	0 56 34.3	6992635
27	2 38 47.93	14 27 57.4	6839876	6 11.6	53 9 13.4	0 56 29.1	6992837
28	2 39 5.42	14 29 36.7	6854330	6 8.0	53 14 36.6	0 56 24.0	6993040
29	2 39 23.64	14 31 19.2	6868750	6 4.3	53 19 59.7	0 56 18.8	6993244
30	2 39 42.58	14 33 4.9	6883134	6 0.7	53 25 22.8	0 56 13.7	6993448
31	2 40 2.24	14 34 53.8	6897477	5 57.1	53 30 45.9	0 56 8.5	6993652
Feb. 1	2 40 22.62	14 36 45.7	6911776	5 53.5	53 36 8.9	0 56 3.3	6993856
2	2 40 43.71	14 38 40.6	6926026	5 50.0	53 41 31.9	0 55 58.1	6994061
3	2 41 5.50	14 40 38.6	6940225	5 46.4	53 46 54.9	0 55 52.9	6994266
4	2 41 27.98	14 42 39.4	6954368	5 42.8	53 52 17.9	0 55 47.7	6994472
5	2 41 51.14	14 44 43.1	6968454	5 39.3	53 57 40.8	0 55 42.5	6994678
6	2 42 14.99	14 46 49.6	6982478	5 35.7	54 3 3.7	0 55 37.3	6994885
7	2 42 39.51	14 48 58.9	6996438	5 32.2	54 8 26.5	0 55 32.1	6995091
8	2 43 4.69	14 51 10.9	7010330	5 28.7	54 13 49.3	0 55 26.9	6995298
9	2 43 30.51	14 53 25.6	7024152	5 25.2	54 19 12.1	0 55 21.6	6995505
10	2 43 56.99	14 55 42.9	7037901	5 21.7	54 24 34.8	0 55 16.4	6995713
11	2 44 24.10	14 58 2.7	7051575	5 18.2	54 29 57.5	0 55 11.1	6995921



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>South. ° ' "</i>	<i>°</i>
Feb. 11	2 44 24.10	14 58 2.7	7051575	5 18.2	54 29 57.5	0 55 11.1	6995921
12	2 44 51.85	15 0 25.0	7065171	5 14.8	54 35 20.2	0 55 5.9	6996129
13	2 45 20.22	15 2 49.8	7078688	5 11.3	54 40 42.9	0 55 0.6	6996338
14	2 45 49.20	15 5 16.9	7092122	5 7.9	54 46 5.5	0 54 55.3	6996547
15	2 46 18.80	15 7 46.4	7105471	5 4.4	54 51 28.1	0 54 50.1	6996756
16	2 46 48.99	15 10 18.1	7118735	5 1.0	54 56 50.6	0 54 44.8	6996966
17	2 47 19.78	15 12 52.0	7131910	4 57.6	55 2 13.1	0 54 39.5	6997176
18	2 47 51.15	15 15 28.1	7144996	4 54.2	55 7 35.6	0 54 34.2	6997387
19	2 48 23.11	15 18 6.4	7157989	4 50.8	55 12 58.0	0 54 28.9	6997598
20	2 48 55.64	15 20 46.7	7170890	4 47.4	55 18 20.4	0 54 23.5	6997809
21	2 49 28.74	15 23 29.1	7183695	4 44.0	55 23 42.8	0 54 18.2	6998021
22	2 50 2.40	15 26 13.5	7196403	4 40.6	55 29 5.2	0 54 12.9	6998233
23	2 50 36.62	15 28 59.7	7209012	4 37.3	55 34 27.5	0 54 7.5	6998445
24	2 51 11.39	15 31 47.9	7221520	4 33.9	55 39 49.8	0 54 2.2	6998657
25	2 51 46.70	15 34 37.8	7233925	4 30.6	55 45 12.0	0 53 56.8	6998870
26	2 52 22.55	15 37 29.6	7246225	4 27.2	55 50 34.2	0 53 51.5	6999084
27	2 52 58.94	15 40 23.1	7258417	4 23.9	55 55 56.4	0 53 46.1	6999297
28	2 53 35.85	15 43 18.3	7270502	4 20.6	56 1 18.6	0 53 40.7	6999511
Mar. 1	2 54 13.27	15 46 15.1	7282475	4 17.3	56 6 40.7	0 53 35.3	6999726
2	2 54 51.21	15 49 13.5	7294337	4 14.0	56 12 2.8	0 53 30.0	6999941
3	2 55 29.65	15 52 13.5	7306086	4 10.7	56 17 24.9	0 53 24.6	7000156
4	2 56 8.58	15 55 14.9	7317718	4 7.4	56 22 46.9	0 53 19.1	7000372
5	2 56 47.99	15 58 17.8	7329234	4 4.1	56 28 8.9	0 53 13.7	7000588
6	2 57 27.89	16 1 22.1	7340632	4 0.9	56 33 30.8	0 53 8.3	7000804
7	2 58 8.25	16 4 27.6	7351910	3 57.6	56 38 52.7	0 53 2.9	7001020
8	2 58 49.08	16 7 34.4	7363067	3 54.3	56 44 14.6	0 52 57.4	7001237
9	2 59 30.37	16 10 42.4	7374103	3 51.1	56 49 36.5	0 52 52.0	7001454
10	3 0 12.11	16 13 51.6	7385016	3 47.9	56 54 58.3	0 52 46.5	7001672
11	3 0 54.30	16 17 1.9	7395804	3 44.6	57 0 20.1	0 52 41.1	7001890
12	3 1 36.92	16 20 13.2	7406468	3 41.4	57 5 41.9	0 52 35.6	7002108
13	3 2 19.96	16 23 25.5	7417007	3 38.2	57 11 3.6	0 52 30.1	7002327
14	3 3 3.42	16 26 38.8	7427420	3 35.0	57 16 25.3	0 52 24.7	7002546
15	3 3 47.30	16 29 52.9	7437705	3 31.8	57 21 46.9	0 52 19.2	7002766
16	3 4 31.58	16 33 7.9	7447862	3 28.6	57 27 8.5	0 52 13.7	7002986
17	3 5 16.26	16 36 23.7	7457892	3 25.4	57 32 30.1	0 52 8.2	7003206
18	3 6 1.34	16 39 40.3	7467793	3 22.2	57 37 51.7	0 52 2.6	7003426
19	3 6 46.80	16 42 57.7	7477565	3 19.0	57 43 13.2	0 51 57.1	7003647
20	3 7 32.65	16 46 15.7	7487207	3 15.8	57 48 34.7	0 51 51.6	7003868
21	3 8 18.88	16 49 34.4	7496719	3 12.7	57 53 56.1	0 51 46.1	7004090
22	3 9 5.49	16 52 53.7	7506101	3 9.5	57 59 17.6	0 51 40.5	7004312
23	3 9 52.46	16 56 13.5	7515352	3 6.4	58 4 39.0	0 51 35.0	7004534
24	3 10 39.80	16 59 33.8	7524471	3 3.2	58 10 0.3	0 51 29.4	7004756



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	North. ° ' "	°	h m	° ' "	South. ° ' "	°
Mar. 24	3 10 39.80	16 59 33.8	7524471	3 3' 2	58 10 0.3	0 51 29.4	7004756
25	3 11 27.49	17 2 54.6	7533456	3 0' 1	58 15 21.6	0 51 23.9	7004979
26	3 12 15.54	17 6 15.9	7542308	2 57' 0	58 20 42.9	0 51 18.3	7005202
27	3 13 3.93	17 9 37.5	7551024	2 53' 8	58 26 4.2	0 51 12.7	7005426
28	3 13 52.66	17 12 59.5	7559604	2 50' 7	58 31 25.4	0 51 7.2	7005650
29	3 14 41.71	17 16 21.7	7568048	2 47' 6	58 36 46.6	0 51 1.6	7005874
30	3 15 31.10	17 19 44.3	7576355	2 44' 5	58 42 7.8	0 50 56.0	7006099
31	3 16 20.81	17 23 7.0	7584524	2 41' 4	58 47 28.9	0 50 50.4	7006324
Apr. 1	3 17 10.83	17 26 30.0	7592554	2 38' 3	58 52 50.0	0 50 44.8	7006549
2	3 18 1.16	17 29 53.0	7600446	2 35' 2	58 58 11.0	0 50 39.1	7006775
3	3 18 51.80	17 33 16.2	7608198	2 32' 1	59 3 32.1	0 50 33.5	7007001
4	3 19 42.73	17 36 39.4	7615810	2 29' 0	59 8 53.1	0 50 27.9	7007227
5	3 20 33.95	17 40 2.6	7623282	2 25' 9	59 14 14.0	0 50 22.3	7007454
6	3 21 25.45	17 43 25.8	7630614	2 22' 8	59 19 34.9	0 50 16.6	7007681
7	3 22 17.23	17 46 49.0	7637805	2 19' 8	59 24 55.8	0 50 11.0	7007909
8	3 23 9.28	17 50 12.0	7644855	2 16' 7	59 30 16.7	0 50 5.3	7008136
9	3 24 1.59	17 53 34.9	7651763	2 13' 6	59 35 37.5	0 49 59.6	7008364
10	3 24 54.16	17 56 57.6	7658531	2 10' 6	59 40 58.3	0 49 54.0	7008592
11	3 25 46.98	18 0 20.1	7665157	2 7' 5	59 46 19.1	0 49 48.3	7008821
12	3 26 40.04	18 3 42.3	7671642	2 4' 5	59 51 39.9	0 49 42.6	7009050
13	3 27 33.34	18 7 4.2	7677986	2 1' 4	59 57 0.6	0 49 36.9	7009279
14	3 28 26.88	18 10 25.8	7684189	1 58' 4	60 2 21.2	0 49 31.2	7009509
15	3 29 20.65	18 13 47.0	7690251	1 55' 3	60 7 41.9	0 49 25.5	7009739
16	3 30 14.64	18 17 7.8	7696173	1 52' 3	60 13 2.5	0 49 19.8	7009969
17	3 31 8.86	18 20 28.1	7701953	1 49' 3	60 18 23.1	0 49 14.1	7010200
18	3 32 3.29	18 23 48.0	7707592	1 46' 2	60 23 43.6	0 49 8.4	7010431
19	3 32 57.94	18 27 7.4	7713089	1 43' 2	60 29 4.1	0 49 2.6	7010663
20	3 33 52.79	18 30 26.3	7718445	1 40' 2	60 34 24.6	0 48 56.9	7010894
21	3 34 47.85	18 33 44.6	7723660	1 37' 2	60 39 45.0	0 48 51.2	7011126
22	3 35 43.11	18 37 2.4	7728733	1 34' 2	60 45 5.4	0 48 45.4	7011359
23	3 36 38.56	18 40 19.6	7733664	1 31' 1	60 50 25.8	0 48 39.7	7011591
24	3 37 34.20	18 43 36.1	7738452	1 28' 1	60 55 46.1	0 48 33.9	7011824
25	3 38 30.03	18 46 52.0	7743096	1 25' 1	61 1 6.4	0 48 28.1	7012058
26	3 39 26.03	18 50 7.2	7747598	1 22' 1	61 6 26.7	0 48 22.4	7012291
27	3 40 22.21	18 53 21.7	7751956	1 19' 1	61 11 46.9	0 48 16.6	7012525
28	3 41 18.55	18 56 35.4	7756169	1 16' 1	61 17 7.1	0 48 10.8	7012759
29	3 42 15.05	18 59 48.4	7760239	1 13' 1	61 22 27.3	0 48 5.0	7012994
30	3 43 11.71	19 3 0.6	7764164	1 10' 1	61 27 47.4	0 47 59.2	7013229
May 1	3 44 8.52	19 6 11.9	7767944	1 7' 2	61 33 7.5	0 47 53.4	7013464
2	3 45 5.48	19 9 22.4	7771580	1 4' 2	61 38 27.6	0 47 47.6	7013699
3	3 46 2.58	19 12 32.0	7775070	1 1' 2	61 43 47.6	0 47 41.8	7013935
4	3 46 59.81	19 15 40.6	7778416	0 58' 2	61 49 7.6	0 47 36.0	7014171



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div>North.</div> <div>° ' "</div> <div>°</div> </div>							
<div> <div>h m s</div> <div>h m</div> <div>° ' "</div> <div>°</div> </div>							
May 4	3 46 59.81	19 15 40.6	.7778416	0 58.2	61 49 7.6	0 47 36.0	.7014171
5	3 47 57.17	19 18 48.3	.7781618	0 55.2	61 54 27.6	0 47 30.1	.7014408
6	3 48 54.65	19 21 55.1	.7784676	0 52.2	61 59 47.5	0 47 24.2	.7014645
7	3 49 52.25	19 25 0.8	.7787589	0 49.3	62 5 7.4	0 47 18.4	.7014882
8	3 50 49.96	19 28 5.5	.7790359	0 46.3	62 10 27.3	0 47 12.6	.7015119
9	3 51 47.77	19 31 9.1	.7792986	0 43.3	62 15 47.1	0 47 6.7	.7015357
10	3 52 45.69	19 34 11.7	.7795470	0 40.4	62 21 6.9	0 47 0.9	.7015595
11	3 53 43.69	19 37 13.2	.7797811	0 37.4	62 26 26.7	0 46 55.0	.7015833
12	3 54 41.80	19 40 13.5	.7800009	0 34.4	62 31 46.4	0 46 49.1	.7016072
13	3 55 39.99	19 43 12.7	.7802065	0 31.5	62 37 6.1	0 46 43.3	.7016311
14	3 56 38.26	19 46 10.8	.7803978	0 28.5	62 42 25.8	0 46 37.4	.7016550
15	3 57 36.61	19 49 7.7	.7805749	0 25.5	62 47 45.4	0 46 31.5	.7016789
16	3 58 35.03	19 52 3.3	.7807377	0 22.6	62 53 5.0	0 46 25.6	.7017029
17	3 59 33.53	19 54 57.8	.7808863	0 19.6	62 58 24.6	0 46 19.7	.7017269
18	4 0 32.09	19 57 51.0	.7810207	0 16.6	63 3 44.1	0 46 13.8	.7017510
19	4 1 30.72	20 0 43.0	.7811408	0 13.7	63 9 3.5	0 46 7.9	.7017750
20	4 2 29.40	20 3 33.8	.7812467	0 10.7	63 14 23.0	0 46 2.0	.7017991
21	4 3 28.14	20 6 23.3	.7813384	0 7.8	63 19 42.4	0 45 56.0	.7018232
22	4 4 26.92	20 9 11.5	.7814158	0 4.8	63 25 1.8	0 45 50.1	.7018474
23	4 5 25.75	20 11 58.4	.7814789	0 1.8	63 30 21.1	0 45 44.2	.7018716
24	4 6 24.62	20 14 44.0	.7815278	23 55.9	63 35 40.4	0 45 38.2	.7018958
25	4 7 23.52	20 17 28.2	.7815624	23 53.0	63 40 59.7	0 45 32.3	.7019201
26	4 8 22.45	20 20 11.1	.7815827	23 50.0	63 46 19.0	0 45 26.3	.7019444
27	4 9 21.40	20 22 52.6	.7815886	23 47.1	63 51 38.2	0 45 20.4	.7019687
28	4 10 20.37	20 25 32.7	.7815802	23 44.1	63 56 57.3	0 45 14.4	.7019931
29	4 11 19.36	20 28 11.4	.7815575	23 41.2	64 2 16.5	0 45 8.4	.7020175
30	4 12 18.35	20 30 48.7	.7815205	23 38.2	64 7 35.6	0 45 2.4	.7020419
31	4 13 17.34	20 33 24.5	.7814691	23 35.3	64 12 54.6	0 44 56.5	.7020663
June 1	4 14 16.32	20 35 58.9	.7814035	23 32.3	64 18 13.6	0 44 50.5	.7020908
2	4 15 15.30	20 38 31.9	.7813236	23 29.4	64 23 32.6	0 44 44.5	.7021153
3	4 16 14.25	20 41 3.3	.7812295	23 26.4	64 28 51.6	0 44 38.5	.7021398
4	4 17 13.19	20 43 33.3	.7811211	23 23.4	64 34 10.5	0 44 32.5	.7021644
5	4 18 12.09	20 46 1.8	.7809985	23 20.5	64 39 29.4	0 44 26.4	.7021890
6	4 19 10.97	20 48 28.7	.7808618	23 17.5	64 44 48.3	0 44 20.4	.7022136
7	4 20 9.80	20 50 54.1	.7807110	23 14.6	64 50 7.1	0 44 14.4	.7022383
8	4 21 8.58	20 53 18.0	.7805462	23 11.6	64 55 25.9	0 44 8.4	.7022630
9	4 22 7.32	20 55 40.3	.7803673	23 8.7	65 0 44.6	0 44 2.3	.7022878
10	4 23 6.00	20 58 1.1	.7801744	23 5.7	65 6 3.3	0 43 56.3	.7023125
11	4 24 4.63	21 0 20.3	.7799675	23 2.7	65 11 22.0	0 43 50.2	.7023373
12	4 25 3.20	21 2 38.0	.7797467	22 59.8	65 16 40.7	0 43 44.2	.7023622
13	4 26 1.70	21 4 54.0	.7795119	22 56.8	65 21 59.3	0 43 38.1	.7023870
14	4 27 0.14	21 7 8.5	.7792633	22 53.9	65 27 17.9	0 43 32.1	.7024119



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	North.		°			South.	°
	h m s	° ' "		h m	° ' "		
June 14	4 27 0.14	21 7 8.5	.7792633	22 53.9	65 27 17.9	0 43 32.1	.7024119
15	4 27 58.50	21 9 21.4	.7790007	22 50.9	65 32 36.4	0 43 26.0	.7024368
16	4 28 56.78	21 11 32.7	.7787243	22 47.9	65 37 54.9	0 43 19.9	.7024617
17	4 29 54.98	21 13 42.4	.7784339	22 45.0	65 43 13.4	0 43 13.8	.7024867
18	4 30 53.09	21 15 50.6	.7781296	22 42.0	65 48 31.8	0 43 7.8	.7025117
19	4 31 51.11	21 17 57.1	.7778114	22 39.0	65 53 50.2	0 43 1.7	.7025367
20	4 32 49.03	21 20 2.1	.7774793	22 36.0	65 59 8.5	0 42 55.6	.7025617
21	4 33 46.85	21 22 5.5	.7771332	22 33.1	66 4 26.8	0 42 49.5	.7025868
22	4 34 44.55	21 24 7.2	.7767732	22 30.1	66 9 45.1	0 42 43.4	.7026119
23	4 35 42.14	21 26 7.4	.7763993	22 27.1	66 15 3.3	0 42 37.2	.7026370
24	4 36 39.60	21 28 6.0	.7760114	22 24.1	66 20 21.5	0 42 31.1	.7026622
25	4 37 36.93	21 30 2.9	.7756097	22 21.1	66 25 39.7	0 42 25.0	.7026874
26	4 38 34.13	21 31 58.2	.7751940	22 18.2	66 30 57.8	0 42 18.9	.7027126
27	4 39 31.20	21 33 51.9	.7747645	22 15.2	66 36 15.9	0 42 12.7	.7027379
28	4 40 28.11	21 35 43.9	.7743211	22 12.2	66 41 34.0	0 42 6.6	.7027632
29	4 41 24.87	21 37 34.4	.7738639	22 9.2	66 46 52.0	0 42 0.5	.7027885
30	4 42 21.47	21 39 23.2	.7733929	22 6.2	66 52 10.0	0 41 54.3	.7028138
July 1	4 43 17.90	21 41 10.3	.7729081	22 3.2	66 57 27.9	0 41 48.1	.7028392
2	4 44 14.16	21 42 55.8	.7724096	22 0.2	67 2 45.8	0 41 42.0	.7028646
3	4 45 10.24	21 44 39.7	.7718974	21 57.2	67 8 3.7	0 41 35.8	.7028900
4	4 46 6.14	21 46 22.0	.7713716	21 54.2	67 13 21.5	0 41 29.6	.7029155
5	4 47 1.84	21 48 2.6	.7708323	21 51.2	67 18 39.3	0 41 23.5	.7029409
6	4 47 57.36	21 49 41.5	.7702794	21 48.2	67 23 57.1	0 41 17.3	.7029664
7	4 48 52.67	21 51 18.9	.7697131	21 45.2	67 29 14.8	0 41 11.1	.7029920
8	4 49 47.77	21 52 54.6	.7691334	21 42.2	67 34 32.5	0 41 4.9	.7030176
9	4 50 42.67	21 54 28.7	.7685404	21 39.1	67 39 50.1	0 40 58.7	.7030432
10	4 51 37.34	21 56 1.2	.7679341	21 36.1	67 45 7.7	0 40 52.5	.7030688
11	4 52 31.80	21 57 32.1	.7673145	21 33.1	67 50 25.3	0 40 46.3	.7030944
12	4 53 26.02	21 59 1.4	.7666817	21 30.0	67 55 42.8	0 40 40.1	.7031201
13	4 54 20.01	22 0 29.1	.7660357	21 27.0	68 1 0.3	0 40 33.9	.7031458
14	4 55 13.76	22 1 55.2	.7653765	21 23.9	68 6 17.7	0 40 27.7	.7031715
15	4 56 7.27	22 3 19.8	.7647042	21 20.9	68 11 35.1	0 40 21.4	.7031972
16	4 57 0.54	22 4 42.8	.7640187	21 17.8	68 16 52.5	0 40 15.2	.7032230
17	4 57 53.54	22 6 4.2	.7633201	21 14.8	68 22 9.8	0 40 9.0	.7032488
18	4 58 46.29	22 7 24.1	.7626083	21 11.7	68 27 27.1	0 40 2.7	.7032746
19	4 59 38.76	22 8 42.5	.7618835	21 8.6	68 32 44.4	0 39 56.5	.7033005
20	5 0 30.96	22 9 59.4	.7611455	21 5.6	68 38 1.6	0 39 50.2	.7033264
21	5 1 22.88	22 11 14.7	.7603944	21 2.5	68 43 18.8	0 39 44.0	.7033523
22	5 2 14.51	22 12 28.5	.7596303	20 59.4	68 48 35.9	0 39 37.7	.7033782
23	5 3 5.84	22 13 40.8	.7588533	20 56.3	68 53 53.0	0 39 31.4	.7034041
24	5 3 56.87	22 14 51.6	.7580632	20 53.2	68 59 10.0	0 39 25.2	.7034301
25	5 4 47.58	22 16 0.9	.7572603	20 50.1	69 4 27.0	0 39 18.9	.7034561



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div> <div>h m s</div> <div>° ' "</div> </div> <div> <div>North.</div> <div>°</div> </div> </div> <div> <div>h m</div> <div>° ' "</div> </div> <div> <div>South.</div> <div>°</div> </div>							
July 25	5 4 47.58	22 16 0.9	.7572603	20 50.1	69 4 27.0	0 39 18.9	.7034561
26	5 5 37.98	22 17 8.7	.7564446	20 47.0	69 9 44.0	0 39 12.6	.7034821
27	5 6 28.05	22 18 15.0	.7556161	20 43.9	69 15 1.0	0 39 6.3	.7035082
28	5 7 17.78	22 19 19.8	.7547749	20 40.8	69 20 17.9	0 39 0.0	.7035342
29	5 8 7.17	22 20 23.2	.7539212	20 37.7	69 25 34.7	0 38 53.7	.7035603
30	5 8 56.22	22 21 25.2	.7530550	20 34.6	69 30 51.5	0 38 47.4	.7035865
31	5 9 44.90	22 22 25.7	.7521763	20 31.5	69 36 8.3	0 38 41.1	.7036126
Aug. 1	5 10 33.22	22 23 24.8	.7512853	20 28.3	69 41 25.1	0 38 34.8	.7036388
2	5 11 21.18	22 24 22.5	.7503821	20 25.2	69 46 41.8	0 38 28.5	.7036650
3	5 12 8.75	22 25 18.8	.7494668	20 22.0	69 51 58.4	0 38 22.2	.7036912
4	5 12 55.95	22 26 13.7	.7485395	20 18.9	69 57 15.1	0 38 15.9	.7037175
5	5 13 42.75	22 27 7.2	.7476002	20 15.7	70 2 31.6	0 38 9.5	.7037438
6	5 14 29.16	22 27 59.4	.7466490	20 12.5	70 7 48.2	0 38 3.2	.7037701
7	5 15 15.16	22 28 50.2	.7456861	20 9.4	70 13 4.7	0 37 56.9	.7037964
8	5 16 0.76	22 29 39.8	.7447115	20 6.2	70 18 21.2	0 37 50.5	.7038228
9	5 16 45.94	22 30 28.0	.7437254	20 3.0	70 23 37.6	0 37 44.2	.7038492
10	5 17 30.69	22 31 15.0	.7427277	19 59.8	70 28 53.9	0 37 37.8	.7038756
11	5 18 15.02	22 32 0.7	.7417186	19 56.6	70 34 10.3	0 37 31.5	.7039020
12	5 18 58.90	22 32 45.1	.7406982	19 53.4	70 39 26.6	0 37 25.1	.7039284
13	5 19 42.34	22 33 28.4	.7396666	19 50.2	70 44 42.8	0 37 18.7	.7039549
14	5 20 25.34	22 34 10.4	.7386238	19 47.0	70 49 59.0	0 37 12.4	.7039814
15	5 21 7.87	22 34 51.2	.7375699	19 43.7	70 55 15.2	0 37 6.0	.7040079
16	5 21 49.93	22 35 30.9	.7365049	19 40.5	71 0 31.4	0 36 59.6	.7040344
17	5 22 31.52	22 36 9.4	.7354291	19 37.3	71 5 47.5	0 36 53.2	.7040610
18	5 23 12.63	22 36 46.7	.7343425	19 34.0	71 11 3.5	0 36 46.8	.7040876
19	5 23 53.25	22 37 22.9	.7332451	19 30.7	71 16 19.5	0 36 40.4	.7041142
20	5 24 33.37	22 37 58.0	.7321371	19 27.4	71 21 35.5	0 36 34.0	.7041408
21	5 25 12.99	22 38 32.0	.7310187	19 24.1	71 26 51.4	0 36 27.6	.7041674
22	5 25 52.08	22 39 4.9	.7298899	19 20.8	71 32 7.3	0 36 21.2	.7041941
23	5 26 30.66	22 39 36.8	.7287510	19 17.5	71 37 23.2	0 36 14.8	.7042208
24	5 27 8.70	22 40 7.6	.7276020	19 14.2	71 42 39.0	0 36 8.4	.7042475
25	5 27 46.20	22 40 37.4	.7264432	19 10.9	71 47 54.8	0 36 2.0	.7042743
26	5 28 23.14	22 41 6.2	.7252747	19 7.6	71 53 10.5	0 35 55.6	.7043010
27	5 28 59.52	22 41 34.0	.7240968	19 4.3	71 58 26.2	0 35 49.1	.7043278
28	5 29 35.33	22 42 0.9	.7229095	19 0.9	72 3 41.9	0 35 42.7	.7043547
29	5 30 10.57	22 42 26.8	.7217131	18 57.6	72 8 57.5	0 35 36.3	.7043815
30	5 30 45.22	22 42 51.8	.7205077	18 54.2	72 14 13.1	0 35 29.8	.7044084
31	5 31 19.27	22 43 15.8	.7192936	18 50.8	72 19 28.6	0 35 23.4	.7044353
Sept. 1	5 31 52.73	22 43 38.9	.7180710	18 47.5	72 24 44.1	0 35 16.9	.7044622
2	5 32 25.57	22 44 1.2	.7168402	18 44.1	72 29 59.6	0 35 10.5	.7044891
3	5 32 57.81	22 44 22.6	.7156012	18 40.7	72 35 15.0	0 35 4.0	.7045161
4	5 33 29.42	22 44 43.2	.7143543	18 37.2	72 40 30.4	0 34 57.6	.7045430



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North. ° ' "</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>South. ° ' "</i>	<i>°</i>
Sept. 4	5 33 29.42	22 44 43.2	.7143543	18 37.2	72 40 30.4	0 34 57.6	.7045430
5	5 34 0.40	22 45 2.9	.7130998	18 33.8	72 45 45.7	0 34 51.1	.7045700
6	5 34 30.75	22 45 21.9	.7118380	18 30.4	72 51 1.0	0 34 44.6	.7045970
7	5 35 0.46	22 45 40.2	.7105689	18 26.9	72 56 16.3	0 34 38.2	.7046241
8	5 35 29.52	22 45 57.7	.7092928	18 23.5	73 1 31.5	0 34 31.7	.7046511
9	5 35 57.91	22 46 14.5	.7080099	18 20.0	73 6 46.6	0 34 25.2	.7046782
10	5 36 25.64	22 46 30.6	.7067203	18 16.5	73 12 1.8	0 34 18.7	.7047054
11	5 36 52.70	22 46 46.0	.7054244	18 13.0	73 17 16.9	0 34 12.2	.7047325
12	5 37 19.08	22 47 0.7	.7041223	18 9.5	73 22 31.9	0 34 5.7	.7047596
13	5 37 44.77	22 47 14.8	.7028142	18 6.0	73 27 46.9	0 33 59.3	.7047868
14	5 38 9.76	22 47 28.3	.7015005	18 2.5	73 33 1.9	0 33 52.8	.7048140
15	5 38 34.05	22 47 41.1	.7001813	17 58.9	73 38 16.9	0 33 46.3	.7048412
16	5 38 57.62	22 47 53.4	.6988570	17 55.4	73 43 31.8	0 33 39.7	.7048684
17	5 39 20.47	22 48 5.1	.6975278	17 51.8	73 48 46.6	0 33 33.2	.7048957
18	5 39 42.59	22 48 16.2	.6961939	17 48.2	73 54 1.4	0 33 26.7	.7049230
19	5 40 3.97	22 48 26.8	.6948558	17 44.7	73 59 16.2	0 33 20.2	.7049503
20	5 40 24.60	22 48 36.8	.6935137	17 41.1	74 4 30.9	0 33 13.7	.7049776
21	5 40 44.47	22 48 46.4	.6921679	17 37.4	74 9 45.6	0 33 7.2	.7050049
22	5 41 3.58	22 48 55.4	.6908189	17 33.8	74 15 0.3	0 33 0.6	.7050323
23	5 41 21.92	22 49 3.9	.6894669	17 30.2	74 20 14.9	0 32 54.1	.7050597
24	5 41 39.48	22 49 12.0	.6881123	17 26.5	74 25 29.5	0 32 47.6	.7050871
25	5 41 56.25	22 49 19.6	.6867555	17 22.9	74 30 44.0	0 32 41.0	.7051145
26	5 42 12.23	22 49 26.8	.6853969	17 19.2	74 35 58.5	0 32 34.5	.7051419
27	5 42 27.41	22 49 33.5	.6840370	17 15.5	74 41 13.0	0 32 27.9	.7051694
28	5 42 41.78	22 49 39.9	.6826760	17 11.8	74 46 27.4	0 32 21.4	.7051969
29	5 42 55.34	22 49 45.8	.6813145	17 8.1	74 51 41.8	0 32 14.8	.7052244
30	5 43 8.09	22 49 51.4	.6799529	17 4.3	74 56 56.1	0 32 8.3	.7052519
Oct. 1	5 43 20.01	22 49 56.6	.6785916	17 0.6	75 2 10.4	0 32 1.7	.7052795
2	5 43 31.11	22 50 1.5	.6772310	16 56.8	75 7 24.7	0 31 55.1	.7053071
3	5 43 41.38	22 50 6.0	.6758714	16 53.1	75 12 38.9	0 31 48.6	.7053347
4	5 43 50.82	22 50 10.2	.6745134	16 49.3	75 17 53.1	0 31 42.0	.7053623
5	5 43 59.42	22 50 14.1	.6731572	16 45.5	75 23 7.2	0 31 35.4	.7053899
6	5 44 7.18	22 50 17.7	.6718034	16 41.7	75 28 21.3	0 31 28.8	.7054176
7	5 44 14.10	22 50 21.0	.6704524	16 37.8	75 33 35.4	0 31 22.2	.7054452
8	5 44 20.17	22 50 24.0	.6691046	16 34.0	75 38 49.4	0 31 15.6	.7054729
9	5 44 25.39	22 50 26.7	.6677604	16 30.2	75 44 3.4	0 31 9.0	.7055006
10	5 44 29.75	22 50 29.1	.6664204	16 26.3	75 49 17.3	0 31 2.4	.7055284
11	5 44 33.25	22 50 31.2	.6650849	16 22.4	75 54 31.2	0 30 55.8	.7055561
12	5 44 35.89	22 50 33.1	.6637544	16 18.5	75 59 45.1	0 30 49.2	.7055839
13	5 44 37.66	22 50 34.7	.6624294	16 14.6	76 4 58.9	0 30 42.6	.7056117
14	5 44 38.56	22 50 36.1	.6611103	16 10.7	76 10 12.7	0 30 36.0	.7056395
15	5 44 38.59	22 50 37.2	.6597978	16 6.7	76 15 26.4	0 30 29.4	.7056673



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div> <div>h m s</div> <div>° ' "</div> </div> <div> <div>North.</div> <div>°</div> </div> </div>							
Oct. 15	5 44 38.59	22 50 37.2	6.597978	16 6.7	76 15 26.4	0 30 29.4	7056673
16	5 44 37.74	22 50 38.0	6.584923	16 2.8	76 20 40.1	0 30 22.8	7056951
17	5 44 36.02	22 50 38.5	6.571943	15 58.8	76 25 53.8	0 30 16.2	7057230
18	5 44 33.42	22 50 38.8	6.559044	15 54.8	76 31 7.4	0 30 9.5	7057509
19	5 44 29.94	22 50 38.8	6.546232	15 50.8	76 36 21.0	0 30 2.9	7057788
20	5 44 25.58	22 50 38.6	6.533513	15 46.8	76 41 34.5	0 29 56.3	7058067
21	5 44 20.34	22 50 38.1	6.520892	15 42.8	76 46 48.0	0 29 49.6	7058346
22	5 44 14.22	22 50 37.3	6.508375	15 38.7	76 52 1.5	0 29 43.0	7058626
23	5 44 7.23	22 50 36.3	6.495968	15 34.7	76 57 14.9	0 29 36.4	7058906
24	5 43 59.35	22 50 35.0	6.483678	15 30.6	77 2 28.3	0 29 29.7	7059186
25	5 43 50.61	22 50 33.4	6.471510	15 26.5	77 7 41.6	0 29 23.1	7059466
26	5 43 40.99	22 50 31.6	6.459471	15 22.4	77 12 54.9	0 29 16.4	7059746
27	5 43 30.51	22 50 29.4	6.447567	15 18.3	77 18 8.2	0 29 9.8	7060027
28	5 43 19.18	22 50 27.0	6.435803	15 14.2	77 23 21.4	0 29 3.1	7060307
29	5 43 6.99	22 50 24.3	6.424186	15 10.1	77 28 34.6	0 28 56.4	7060588
30	5 42 53.96	22 50 21.3	6.412724	15 5.9	77 33 47.8	0 28 49.8	7060869
31	5 42 40.09	22 50 17.9	6.401420	15 1.7	77 39 0.9	0 28 43.1	7061151
Nov. 1	5 42 25.40	22 50 14.2	6.390282	14 57.5	77 44 13.9	0 28 36.4	7061432
2	5 42 9.88	22 50 10.2	6.379313	14 53.3	77 49 27.0	0 28 29.8	7061714
3	5 41 53.55	22 50 5.8	6.368521	14 49.1	77 54 40.0	0 28 23.1	7061996
4	5 41 36.42	22 50 1.1	6.357910	14 44.9	77 59 52.9	0 28 16.4	7062278
5	5 41 18.49	22 49 56.0	6.347486	14 40.7	78 5 5.8	0 28 9.7	7062560
6	5 40 59.78	22 49 50.6	6.337255	14 36.4	78 10 18.7	0 28 3.0	7062843
7	5 40 40.29	22 49 44.8	6.327223	14 32.2	78 15 31.5	0 27 56.3	7063125
8	5 40 20.04	22 49 38.7	6.317394	14 27.9	78 20 44.3	0 27 49.6	7063408
9	5 39 59.04	22 49 32.1	6.307775	14 23.6	78 25 57.1	0 27 43.0	7063691
10	5 39 37.29	22 49 25.2	6.298372	14 19.3	78 31 9.8	0 27 36.3	7063974
11	5 39 14.82	22 49 17.9	6.289189	14 15.0	78 36 22.5	0 27 29.6	7064257
12	5 38 51.62	22 49 10.1	6.280233	14 10.7	78 41 35.2	0 27 22.9	7064541
13	5 38 27.72	22 49 1.9	6.271509	14 6.3	78 46 47.8	0 27 16.1	7064824
14	5 38 3.14	22 48 53.2	6.263024	14 2.0	78 52 0.3	0 27 9.4	7065108
15	5 37 37.87	22 48 44.0	6.254782	13 57.6	78 57 12.8	0 27 2.7	7065392
16	5 37 11.95	22 48 34.3	6.246790	13 53.2	79 2 25.3	0 26 56.0	7065676
17	5 36 45.38	22 48 24.1	6.239053	13 48.9	79 7 37.8	0 26 49.3	7065961
18	5 36 18.18	22 48 13.5	6.231577	13 44.5	79 12 50.2	0 26 42.6	7066245
19	5 35 50.38	22 48 2.3	6.224367	13 40.1	79 18 2.5	0 26 35.9	7066530
20	5 35 21.99	22 47 50.6	6.217429	13 35.7	79 23 14.9	0 26 29.1	7066815
21	5 34 53.04	22 47 38.4	6.210767	13 31.2	79 28 27.2	0 26 22.4	7067100
22	5 34 23.53	22 47 25.6	6.204386	13 26.8	79 33 39.4	0 26 15.7	7067385
23	5 33 53.49	22 47 12.3	6.198293	13 22.4	79 38 51.6	0 26 8.9	7067671
24	5 33 22.94	22 46 58.5	6.192491	13 18.0	79 44 3.8	0 26 2.2	7067956
25	5 32 51.92	22 46 44.2	6.186984	13 13.5	79 49 15.9	0 25 55.5	7068242



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>North.</i> <i>° ' " N</i>	<i>°</i>	<i>h m</i>	<i>° ' " N</i>	<i>South.</i> <i>° ' " S</i>	<i>°</i>
Nov. 25	5 32 51.92	22 46 44.2	6186984	13 13.5	79 49 15.9	0 25 55.5	7068242
26	5 32 20.43	22 46 29.3	6181776	13 9.1	79 54 28.0	0 25 48.7	7068528
27	5 31 48.52	22 46 13.9	6176871	13 4.6	79 59 40.0	0 25 42.0	7068814
28	5 31 16.19	22 45 58.0	6172272	13 0.1	80 4 52.0	0 25 35.2	7069101
29	5 30 43.49	22 45 41.5	6167984	12 55.6	80 10 4.0	0 25 28.5	7069387
30	5 30 10.43	22 45 24.5	6164009	12 51.2	80 15 15.9	0 25 21.7	7069674
Dec. 1	5 29 37.04	22 45 7.0	6160350	12 46.7	80 20 27.8	0 25 15.0	7069961
2	5 29 3.33	22 44 49.0	6157009	12 42.2	80 25 39.6	0 25 8.2	7070248
3	5 28 29.35	22 44 30.4	6153988	12 37.7	80 30 51.4	0 25 1.5	7070535
4	5 27 55.10	22 44 11.4	6151289	12 33.2	80 36 3.2	0 24 54.7	7070822
5	5 27 20.63	22 43 51.9	6148914	12 28.7	80 41 14.9	0 24 47.9	7071110
6	5 26 45.94	22 43 32.0	6146866	12 24.2	80 46 26.6	0 24 41.2	7071397
7	5 26 11.08	22 43 11.5	6145146	12 19.6	80 51 38.3	0 24 34.4	7071685
8	5 25 36.06	22 42 50.6	6143755	12 15.1	80 56 49.9	0 24 27.6	7071973
9	5 25 0.91	22 42 29.2	6142694	12 10.6	81 2 1.4	0 24 20.9	7072262
10	5 24 25.66	22 42 7.4	6141966	12 6.1	81 7 12.9	0 24 14.1	7072550
11	5 23 50.34	22 41 45.2	6141570	12 1.6	81 12 24.4	0 24 7.3	7072838
12	5 23 14.96	22 41 22.5	6141507	11 57.0	81 17 35.8	0 24 0.5	7073127
13	5 22 39.57	22 40 59.5	6141778	11 52.5	81 22 47.2	0 23 53.7	7073416
14	5 22 4.18	22 40 36.1	6142384	11 48.0	81 27 58.6	0 23 47.0	7073705
15	5 21 28.82	22 40 12.4	6143324	11 43.5	81 33 9.9	0 23 40.2	7073994
16	5 20 53.51	22 39 48.4	6144598	11 39.0	81 38 21.2	0 23 33.4	7074284
17	5 20 18.29	22 39 24.1	6146208	11 34.5	81 43 32.4	0 23 26.6	7074573
18	5 19 43.18	22 38 59.5	6148151	11 30.0	81 48 43.6	0 23 19.8	7074863
19	5 19 8.21	22 38 34.7	6150427	11 25.5	81 53 54.7	0 23 13.0	7075153
20	5 18 33.41	22 38 9.7	6153034	11 21.0	81 59 5.8	0 23 6.2	7075443
21	5 17 58.80	22 37 44.5	6155972	11 16.5	82 4 16.9	0 22 59.4	7075733
22	5 17 24.42	22 37 19.2	6159238	11 12.0	82 9 27.9	0 22 52.6	7076024
23	5 16 50.30	22 36 53.8	6162832	11 7.5	82 14 38.9	0 22 45.8	7076314
24	5 16 16.46	22 36 28.4	6166749	11 3.0	82 19 49.8	0 22 39.0	7076605
25	5 15 42.93	22 36 3.0	6170987	10 58.5	82 25 0.7	0 22 32.2	7076896
26	5 15 9.72	22 35 37.6	6175544	10 54.0	82 30 11.6	0 22 25.4	7077187
27	5 14 36.88	22 35 12.2	6180416	10 49.5	82 35 22.4	0 22 18.6	7077478
28	5 14 4.42	22 34 47.0	6185599	10 45.1	82 40 33.2	0 22 11.7	7077769
29	5 13 32.37	22 34 21.9	6191090	10 40.6	82 45 43.9	0 22 4.9	7078061
30	5 13 0.75	22 33 56.9	6196884	10 36.2	82 50 54.6	0 21 58.1	7078353
31	5 12 29.59	22 33 32.1	6202978	10 31.7	82 56 5.2	0 21 51.3	7078644
32	5 11 58.90	22 33 7.6	6209367	10 27.3	83 1 15.8	0 21 44.5	7078936



## MEAN TIME.

Month and Day.		Geocentric.				Heliocentric.		
		Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
		Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
		South.		I		North.		I
		h m s	° ' "		h m	° ' "	° ' "	
Jan.	1	17 25 40.88	21 59 52.4	0400232	22 38.7	260 14 12.9	1 19 57.5	0017481
	2	17 26 10.31	22 0 18.0	0398029	22 35.2	260 16 1.5	1 19 53.5	0017506
	3	17 26 39.64	22 0 43.1	0395726	22 31.8	260 17 50.1	1 19 49.5	0017531
	4	17 27 8.85	22 1 7.6	0393324	22 28.3	260 19 38.6	1 19 45.5	0017557
	5	17 27 37.95	22 1 31.7	0390823	22 24.9	260 21 27.2	1 19 41.6	0017582
	6	17 28 6.92	22 1 55.2	0388223	22 21.4	260 23 15.8	1 19 37.6	0017607
	7	17 28 35.77	22 2 18.1	0385526	22 18.0	260 25 4.3	1 19 33.6	0017632
	8	17 29 4.48	22 2 40.5	0382731	22 14.5	260 26 52.9	1 19 29.6	0017657
	9	17 29 33.05	22 3 2.4	0379839	22 11.1	260 28 41.5	1 19 25.6	0017682
	10	17 30 1.49	22 3 23.7	0376851	22 7.6	260 30 30.0	1 19 21.6	0017707
	11	17 30 29.77	22 3 44.6	0373767	22 4.1	260 32 18.6	1 19 17.6	0017732
	12	17 30 57.90	22 4 4.9	0370589	22 0.7	260 34 7.1	1 19 13.6	0017757
	13	17 31 25.87	22 4 24.7	0367316	21 57.2	260 35 55.6	1 19 9.6	0017781
	14	17 31 53.69	22 4 44.0	0363950	21 53.7	260 37 44.2	1 19 5.7	0017806
	15	17 32 21.34	22 5 2.8	0360491	21 50.3	260 39 32.7	1 19 1.7	0017831
	16	17 32 48.81	22 5 21.0	0356940	21 46.8	260 41 21.3	1 18 57.7	0017855
	17	17 33 16.11	22 5 38.8	0353297	21 43.3	260 43 9.8	1 18 53.7	0017880
	18	17 33 43.23	22 5 56.1	0349563	21 39.8	260 44 58.3	1 18 49.7	0017904
	19	17 34 10.16	22 6 12.9	0345737	21 36.3	260 46 46.9	1 18 45.7	0017928
	20	17 34 36.90	22 6 29.2	0341822	21 32.8	260 48 35.4	1 18 41.7	0017953
	21	17 35 3.45	22 6 45.0	0337817	21 29.4	260 50 23.9	1 18 37.7	0017977
	22	17 35 29.80	22 7 0.3	0333723	21 25.9	260 52 12.4	1 18 33.6	0018001
	23	17 35 55.95	22 7 15.1	0329540	21 22.3	260 54 0.9	1 18 29.6	0018025
	24	17 36 21.89	22 7 29.4	0325270	21 18.8	260 55 49.5	1 18 25.6	0018049
	25	17 36 47.61	22 7 43.3	0320912	21 15.3	260 57 38.0	1 18 21.6	0018073
	26	17 37 13.12	22 7 56.7	0316468	21 11.8	260 59 26.5	1 18 17.6	0018097
	27	17 37 38.40	22 8 9.6	0311938	21 8.3	261 1 15.0	1 18 13.6	0018121
	28	17 38 3.46	22 8 22.1	0307323	21 4.8	261 3 3.5	1 18 9.6	0018145
	29	17 38 28.27	22 8 34.2	0302625	21 1.2	261 4 52.0	1 18 5.6	0018168
	30	17 38 52.85	22 8 45.8	0297843	20 57.7	261 6 40.5	1 18 1.6	0018192
Feb.	31	17 39 17.18	22 8 56.9	0292979	20 54.2	261 8 29.0	1 17 57.5	0018216
	1	17 39 41.26	22 9 7.6	0288034	20 50.7	261 10 17.5	1 17 53.5	0018239
	2	17 40 5.09	22 9 17.9	0283009	20 47.1	261 12 6.0	1 17 49.5	0018263
	3	17 40 28.65	22 9 27.7	0277905	20 43.6	261 13 54.5	1 17 45.5	0018286
	4	17 40 51.95	22 9 37.2	0272724	20 40.0	261 15 43.0	1 17 41.5	0018310
	5	17 41 14.98	22 9 46.2	0267465	20 36.5	261 17 31.4	1 17 37.4	0018333
	6	17 41 37.74	22 9 54.7	0262131	20 32.9	261 19 19.9	1 17 33.4	0018356
	7	17 42 0.22	22 10 2.9	0256722	20 29.3	261 21 8.4	1 17 29.4	0018379
	8	17 42 22.42	22 10 10.7	0251240	20 25.8	261 22 56.9	1 17 25.4	0018402
	9	17 42 44.32	22 10 18.1	0245687	20 22.2	261 24 45.3	1 17 21.3	0018425
	10	17 43 5.94	22 10 25.1	0240062	20 18.6	261 26 33.8	1 17 17.3	0018448
11	17 43 27.26	22 10 31.8	0234368	20 15.1	261 28 22.2	1 17 13.3	0018471	



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South.</i> <i>° ' "</i>	<i>I</i>	<i>h m</i>	<i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>I</i>
Feb. 11	17 43 27.26	22 10 31.8	.0234368	20 15.1	261 28 22.2	1 17 13.3	.0018471
12	17 43 48.28	22 10 38.1	.0228606	20 11.5	261 30 10.7	1 17 9.2	.0018494
13	17 44 9.00	22 10 44.0	.0222776	20 7.9	261 31 59.1	1 17 5.2	.0018517
14	17 44 29.41	22 10 49.6	.0216881	20 4.3	261 33 47.6	1 17 1.2	.0018540
15	17 44 49.52	22 10 54.8	.0210921	20 0.7	261 35 36.0	1 16 57.1	.0018563
16	17 45 9.30	22 10 59.7	.0204898	19 57.1	261 37 24.5	1 16 53.1	.0018585
17	17 45 28.77	22 11 4.2	.0198812	19 53.4	261 39 12.9	1 16 49.1	.0018608
18	17 45 47.92	22 11 8.5	.0192664	19 49.8	261 41 1.4	1 16 45.0	.0018630
19	17 46 6.75	22 11 12.4	.0186457	19 46.2	261 42 49.8	1 16 41.0	.0018653
20	17 46 25.25	22 11 16.0	.0180191	19 42.6	261 44 38.2	1 16 36.9	.0018675
21	17 46 43.41	22 11 19.4	.0173868	19 38.9	261 46 26.7	1 16 32.9	.0018697
22	17 47 1.23	22 11 22.4	.0167488	19 35.3	261 48 15.1	1 16 28.8	.0018720
23	17 47 18.71	22 11 25.2	.0161053	19 31.6	261 50 3.5	1 16 24.8	.0018742
24	17 47 35.85	22 11 27.7	.0154565	19 28.0	261 51 52.0	1 16 20.7	.0018764
25	17 47 52.63	22 11 29.9	.0148024	19 24.3	261 53 40.4	1 16 16.7	.0018786
26	17 48 9.06	22 11 31.9	.0141432	19 20.7	261 55 28.8	1 16 12.6	.0018808
27	17 48 25.13	22 11 33.6	.0134792	19 17.0	261 57 17.2	1 16 8.6	.0018830
28	17 48 40.84	22 11 35.0	.0128103	19 13.3	261 59 5.6	1 16 4.5	.0018852
Mar. 1	17 48 56.18	22 11 36.2	.0121369	19 9.7	262 0 54.1	1 16 0.5	.0018874
2	17 49 11.15	22 11 37.2	.0114591	19 6.0	262 2 42.5	1 15 56.4	.0018896
3	17 49 25.74	22 11 37.9	.0107770	19 2.3	262 4 30.9	1 15 52.4	.0018917
4	17 49 39.96	22 11 38.4	.0100909	18 58.6	262 6 19.3	1 15 48.3	.0018939
5	17 49 53.80	22 11 38.7	.0094008	18 54.9	262 8 7.7	1 15 44.2	.0018961
6	17 50 7.25	22 11 38.8	.0087071	18 51.1	262 9 56.1	1 15 40.2	.0018982
7	17 50 20.31	22 11 38.7	.0080100	18 47.4	262 11 44.5	1 15 36.1	.0019003
8	17 50 32.99	22 11 38.4	.0073094	18 43.7	262 13 32.9	1 15 32.1	.0019025
9	17 50 45.28	22 11 37.9	.0066058	18 40.0	262 15 21.3	1 15 28.0	.0019046
10	17 50 57.17	22 11 37.3	.0058992	18 36.2	262 17 9.7	1 15 23.9	.0019067
11	17 51 8.66	22 11 36.5	.0051899	18 32.5	262 18 58.1	1 15 19.9	.0019088
12	17 51 19.76	22 11 35.5	.0044780	18 28.7	262 20 46.5	1 15 15.8	.0019109
13	17 51 30.46	22 11 34.3	.0037637	18 25.0	262 22 34.9	1 15 11.7	.0019130
14	17 51 40.75	22 11 33.0	.0030472	18 21.2	262 24 23.3	1 15 7.7	.0019151
15	17 51 50.64	22 11 31.6	.0023286	18 17.4	262 26 11.7	1 15 3.6	.0019172
16	17 52 0.12	22 11 30.0	.0016082	18 13.6	262 28 0.1	1 14 59.5	.0019193
17	17 52 9.20	22 11 28.3	.0008860	18 9.8	262 29 48.4	1 14 55.5	.0019214
18	17 52 17.87	22 11 26.5	.0001624	18 6.1	262 31 36.8	1 14 51.4	.0019234
		<i>0</i>					
19	17 52 26.12	22 11 24.5	.9994375	18 2.3	262 33 25.2	1 14 47.3	.0019255
20	17 52 33.96	22 11 22.5	.9987114	17 58.5	262 35 13.6	1 14 43.2	.0019275
21	17 52 41.38	22 11 20.3	.9979843	17 54.6	262 37 2.0	1 14 39.2	.0019295
22	17 52 48.39	22 11 18.1	.9972565	17 50.8	262 38 50.4	1 14 35.1	.0019316
23	17 52 54.97	22 11 15.7	.9965281	17 47.0	262 40 38.8	1 14 31.0	.0019336
24	17 53 1.14	22 11 13.3	.9957993	17 43.2	262 42 27.1	1 14 26.9	.0019356



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	South. ° ' "	°	h m	° ' "	North. ° ' "	I
Mar. 24	17 53 1.14	22 11 13.3	9957993	17 43.2	262 42 27.1	1 14 26.9	.0019356
25	17 53 6.88	22 11 10.8	9950704	17 39.3	262 44 15.5	1 14 22.9	.0019377
26	17 53 12.19	22 11 8.3	9943416	17 35.5	262 46 3.9	1 14 18.8	.0019397
27	17 53 17.08	22 11 5.6	9936130	17 31.6	262 47 52.3	1 14 14.7	.0019417
28	17 53 21.54	22 11 2.9	9928849	17 27.8	262 49 40.7	1 14 10.6	.0019437
29	17 53 25.57	22 11 0.0	9921576	17 23.9	262 51 29.1	1 14 6.5	.0019456
30	17 53 29.17	22 10 57.1	9914312	17 20.0	262 53 17.4	1 14 2.4	.0019476
31	17 53 32.34	22 10 54.2	9907059	17 16.1	262 55 5.8	1 13 58.3	.0019496
Apr. 1	17 53 35.08	22 10 51.2	9899821	17 12.2	262 56 54.2	1 13 54.3	.0019515
2	17 53 37.39	22 10 48.1	9892600	17 8.3	262 58 42.6	1 13 50.2	.0019535
3	17 53 39.26	22 10 45.0	9885398	17 4.4	263 0 30.9	1 13 46.1	.0019555
4	17 53 40.71	22 10 41.9	9878218	17 0.5	263 2 19.3	1 13 42.0	.0019574
5	17 53 41.72	22 10 38.7	9871061	16 56.6	263 4 7.7	1 13 37.9	.0019593
6	17 53 42.30	22 10 35.5	9863931	16 52.7	263 5 56.1	1 13 33.8	.0019613
7	17 53 42.46	22 10 32.2	9856829	16 48.7	263 7 44.4	1 13 29.7	.0019632
8	17 53 42.18	22 10 29.0	9849757	16 44.8	263 9 32.8	1 13 25.6	.0019651
9	17 53 41.48	22 10 25.7	9842719	16 40.8	263 11 21.2	1 13 21.5	.0019670
10	17 53 40.35	22 10 22.3	9835716	16 36.9	263 13 9.6	1 13 17.4	.0019689
11	17 53 38.80	22 10 19.0	9828750	16 32.9	263 14 57.9	1 13 13.3	.0019708
12	17 53 36.82	22 10 15.6	9821824	16 29.0	263 16 46.3	1 13 9.2	.0019727
13	17 53 34.43	22 10 12.2	9814940	16 25.0	263 18 34.7	1 13 5.1	.0019746
14	17 53 31.62	22 10 8.8	9808100	16 21.0	263 20 23.1	1 13 1.0	.0019765
15	17 53 28.39	22 10 5.4	9801306	16 17.0	263 22 11.4	1 12 56.9	.0019783
16	17 53 24.75	22 10 2.0	9794561	16 13.0	263 23 59.8	1 12 52.8	.0019802
17	17 53 20.69	22 9 58.5	9787866	16 9.0	263 25 48.2	1 12 48.6	.0019821
18	17 53 16.22	22 9 55.0	9781224	16 5.0	263 27 36.6	1 12 44.5	.0019839
19	17 53 11.35	22 9 51.6	9774636	16 1.0	263 29 24.9	1 12 40.4	.0019857
20	17 53 6.06	22 9 48.1	9768106	15 56.9	263 31 13.3	1 12 36.3	.0019876
21	17 53 0.37	22 9 44.6	9761634	15 52.9	263 33 1.7	1 12 32.2	.0019894
22	17 52 54.27	22 9 41.1	9755225	15 48.9	263 34 50.1	1 12 28.1	.0019912
23	17 52 47.78	22 9 37.6	9748879	15 44.8	263 36 38.4	1 12 23.9	.0019930
24	17 52 40.88	22 9 34.1	9742600	15 40.8	263 38 26.8	1 12 19.8	.0019948
25	17 52 33.59	22 9 30.6	9736390	15 36.7	263 40 15.2	1 12 15.7	.0019966
26	17 52 25.90	22 9 27.0	9730251	15 32.7	263 42 3.6	1 12 11.6	.0019984
27	17 52 17.83	22 9 23.4	9724187	15 28.6	263 43 51.9	1 12 7.5	.0020002
28	17 52 9.37	22 9 19.8	9718199	15 24.5	263 45 40.3	1 12 3.3	.0020020
29	17 52 0.52	22 9 16.2	9712290	15 20.4	263 47 28.7	1 11 59.2	.0020038
30	17 51 51.31	22 9 12.6	9706462	15 16.3	263 49 17.1	1 11 55.1	.0020056
May 1	17 51 41.72	22 9 8.9	9700717	15 12.2	263 51 5.5	1 11 50.9	.0020073
2	17 51 31.76	22 9 5.3	9695057	15 8.1	263 52 53.8	1 11 46.8	.0020091
3	17 51 21.44	22 9 1.6	9689485	15 4.0	263 54 42.2	1 11 42.7	.0020108
4	17 51 10.77	22 8 57.9	9684002	14 59.9	263 56 30.6	1 11 38.5	.0020126



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
<div> <div>South.</div> <div>° ' "</div> <div>o</div> <div>h m</div> </div>					<div> <div>North.</div> <div>° ' "</div> <div>l</div> </div>		
May 4	17 51 10.77	22 8 57.9	.9684002	14 59.9	263 56 30.6	1 11 38.5	.0020126
5	17 50 59.75	22 8 54.2	.9678612	14 55.8	263 58 19.0	1 11 34.4	.0020143
6	17 50 48.38	22 8 50.4	.9673316	14 51.7	264 0 7.3	1 11 30.3	.0020161
7	17 50 36.68	22 8 46.7	.9668117	14 47.6	264 1 55.7	1 11 26.1	.0020178
8	17 50 24.64	22 8 42.9	.9663016	14 43.4	264 3 44.1	1 11 22.0	.0020195
9	17 50 12.28	22 8 39.1	.9658016	14 39.3	264 5 32.5	1 11 17.9	.0020212
10	17 49 59.60	22 8 35.4	.9653119	14 35.1	264 7 20.9	1 11 13.7	.0020229
11	17 49 46.61	22 8 31.6	.9648325	14 31.0	264 9 9.3	1 11 9.6	.0020246
12	17 49 33.30	22 8 27.7	.9643637	14 26.8	264 10 57.7	1 11 5.4	.0020263
13	17 49 19.70	22 8 23.8	.9639056	14 22.7	264 12 46.0	1 11 1.3	.0020280
14	17 49 5.80	22 8 19.9	.9634585	14 18.5	264 14 34.4	1 10 57.1	.0020297
15	17 48 51.61	22 8 16.0	.9630224	14 14.3	264 16 22.8	1 10 53.0	.0020313
16	17 48 37.15	22 8 12.0	.9625975	14 10.2	264 18 11.2	1 10 48.8	.0020330
17	17 48 22.40	22 8 8.0	.9621840	14 6.0	264 19 59.6	1 10 44.7	.0020347
18	17 48 7.39	22 8 3.9	.9617821	14 1.8	264 21 48.0	1 10 40.5	.0020363
19	17 47 52.11	22 7 59.8	.9613920	13 57.6	264 23 36.4	1 10 36.4	.0020380
20	17 47 36.58	22 7 55.7	.9610138	13 53.4	264 25 24.8	1 10 32.2	.0020396
21	17 47 20.80	22 7 51.6	.9606477	13 49.2	264 27 13.2	1 10 28.1	.0020413
22	17 47 4.78	22 7 47.4	.9602938	13 45.0	264 29 1.5	1 10 23.9	.0020429
23	17 46 48.53	22 7 43.2	.9599523	13 40.8	264 30 49.9	1 10 19.8	.0020446
24	17 46 32.06	22 7 38.9	.9596235	13 36.6	264 32 38.3	1 10 15.6	.0020462
25	17 46 15.36	22 7 34.6	.9593073	13 32.4	264 34 26.7	1 10 11.5	.0020478
26	17 45 58.46	22 7 30.3	.9590040	13 28.2	264 36 15.1	1 10 7.3	.0020494
27	17 45 41.36	22 7 25.9	.9587138	13 24.0	264 38 3.5	1 10 3.1	.0020510
28	17 45 24.07	22 7 21.5	.9584367	13 19.8	264 39 51.9	1 9 59.0	.0020526
29	17 45 6.60	22 7 17.1	.9581729	13 15.6	264 41 40.3	1 9 54.8	.0020542
30	17 44 48.95	22 7 12.6	.9579225	13 11.3	264 43 28.7	1 9 50.6	.0020558
31	17 44 31.14	22 7 8.0	.9576856	13 7.1	264 45 17.1	1 9 46.5	.0020574
June 1	17 44 13.18	22 7 3.4	.9574624	13 2.9	264 47 5.5	1 9 42.3	.0020590
2	17 43 55.07	22 6 58.8	.9572529	12 58.6	264 48 53.8	1 9 38.2	.0020605
3	17 43 36.83	22 6 54.1	.9570573	12 54.4	264 50 42.2	1 9 34.0	.0020621
4	17 43 18.46	22 6 49.4	.9568755	12 50.1	264 52 30.6	1 9 29.8	.0020637
5	17 42 59.97	22 6 44.7	.9567077	12 45.9	264 54 19.0	1 9 25.6	.0020652
6	17 42 41.38	22 6 40.0	.9565539	12 41.7	264 56 7.4	1 9 21.5	.0020668
7	17 42 22.70	22 6 35.2	.9564141	12 37.4	264 57 55.8	1 9 17.3	.0020683
8	17 42 3.93	22 6 30.4	.9562885	12 33.2	264 59 44.2	1 9 13.1	.0020698
9	17 41 45.09	22 6 25.6	.9561769	12 28.9	265 1 32.6	1 9 9.0	.0020713
10	17 41 26.18	22 6 20.8	.9560796	12 24.7	265 3 21.0	1 9 4.8	.0020728
11	17 41 7.20	22 6 15.9	.9559965	12 20.4	265 5 9.4	1 9 0.6	.0020743
12	17 40 48.18	22 6 11.1	.9559276	12 16.2	265 6 57.8	1 8 56.5	.0020758
13	17 40 29.12	22 6 6.3	.9558729	12 12.0	265 8 46.2	1 8 52.3	.0020773
14	17 40 10.03	22 6 1.4	.9558325	12 7.7	265 10 34.6	1 8 48.1	.0020787



MEAN TIME.									
Month and Day.	Geocentric.				Heliocentric.				
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.		
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.		
June	14	h m s 17 40 10.03	South. ° ' " 22 6 1.4	o .9558325	h m 12 7.7	° ' " 265 10 34.6	North. ° ' " 1 8 48.1	I .0020787	
	15	17 39 50.91	22 5 56.6	.9558064	12 3.5	265 12 22.9	1 8 43.9	.0020802	
	16	17 39 31.78	22 5 51.7	.9557945	11 59.2	265 14 11.3	1 8 39.7	.0020817	
	17	17 39 12.65	22 5 46.9	.9557970	11 54.9	265 15 59.7	1 8 35.6	.0020831	
	18	17 38 53.52	22 5 42.0	.9558137	11 50.7	265 17 48.1	1 8 31.4	.0020846	
	19	17 38 34.41	22 5 37.2	.9558448	11 46.4	265 19 36.5	1 8 27.2	.0020860	
	20	17 38 15.32	22 5 32.4	.9558901	11 42.2	265 21 24.9	1 8 23.0	.0020874	
	21	17 37 56.27	22 5 27.6	.9559498	11 38.0	265 23 13.3	1 8 18.8	.0020888	
	22	17 37 37.26	22 5 22.8	.9560237	11 33.7	265 25 1.6	1 8 14.7	.0020903	
	23	17 37 18.31	22 5 18.1	.9561119	11 29.5	265 26 50.0	1 8 10.5	.0020917	
	24	17 36 59.42	22 5 13.4	.9562143	11 25.2	265 28 38.4	1 8 6.3	.0020931	
July	25	17 36 40.60	22 5 8.7	.9563309	11 21.0	265 30 26.8	1 8 2.1	.0020945	
	26	17 36 21.86	22 5 4.1	.9564617	11 16.7	265 32 15.2	1 7 57.9	.0020958	
	27	17 36 3.22	22 4 59.5	.9566067	11 12.5	265 34 3.5	1 7 53.7	.0020972	
	28	17 35 44.68	22 4 55.0	.9567657	11 8.3	265 35 51.9	1 7 49.5	.0020986	
	29	17 35 26.25	22 4 50.6	.9569386	11 4.0	265 37 40.3	1 7 45.4	.0021000	
	30	17 35 7.94	22 4 46.3	.9571254	10 59.8	265 39 28.7	1 7 41.2	.0021013	
	1	17 34 49.76	22 4 42.0	.9573260	10 55.5	265 41 17.1	1 7 37.0	.0021027	
	2	17 34 31.73	22 4 37.8	.9575403	10 51.3	265 43 5.4	1 7 32.8	.0021040	
	3	17 34 13.85	22 4 33.8	.9577682	10 47.1	265 44 53.8	1 7 28.6	.0021054	
	4	17 33 56.12	22 4 29.8	.9580095	10 42.9	265 46 42.2	1 7 24.4	.0021067	
	5	17 33 38.57	22 4 26.0	.9582641	10 38.6	265 48 30.6	1 7 20.2	.0021080	
	6	17 33 21.19	22 4 22.3	.9585320	10 34.4	265 50 18.9	1 7 16.0	.0021093	
	7	17 33 4.00	22 4 18.7	.9588129	10 30.2	265 52 7.3	1 7 11.8	.0021107	
	8	17 32 47.00	22 4 15.3	.9591067	10 26.0	265 53 55.7	1 7 7.6	.0021120	
	9	17 32 30.20	22 4 12.0	.9594134	10 21.8	265 55 44.0	1 7 3.4	.0021133	
	10	17 32 13.61	22 4 8.9	.9597327	10 17.6	265 57 32.4	1 6 59.2	.0021146	
	11	17 31 57.24	22 4 6.0	.9600645	10 13.4	265 59 20.7	1 6 55.0	.0021159	
	12	17 31 41.09	22 4 3.2	.9604086	10 9.2	266 1 9.1	1 6 50.8	.0021172	
	13	17 31 25.18	22 4 0.5	.9607650	10 5.0	266 2 57.5	1 6 46.6	.0021185	
14	17 31 9.50	22 3 58.0	.9611334	10 0.8	266 4 45.8	1 6 42.4	.0021197		
15	17 30 54.07	22 3 55.7	.9615138	9 56.6	266 6 34.2	1 6 38.2	.0021210		
16	17 30 38.90	22 3 53.6	.9619059	9 52.5	266 8 22.5	1 6 34.0	.0021223		
17	17 30 23.98	22 3 51.7	.9623096	9 48.3	266 10 10.9	1 6 29.7	.0021235		
18	17 30 9.33	22 3 49.9	.9627247	9 44.1	266 11 59.2	1 6 25.5	.0021248		
19	17 29 54.95	22 3 48.4	.9631512	9 39.9	266 13 47.6	1 6 21.3	.0021260		
20	17 29 40.85	22 3 47.1	.9635888	9 35.7	266 15 35.9	1 6 17.1	.0021272		
21	17 29 27.03	22 3 46.1	.9640373	9 31.6	266 17 24.3	1 6 12.9	.0021284		
22	17 29 13.51	22 3 45.3	.9644967	9 27.4	266 19 12.6	1 6 8.7	.0021296		
23	17 29 0.29	22 3 44.8	.9649667	9 23.3	266 21 0.9	1 6 4.5	.0021309		
24	17 28 47.38	22 3 44.5	.9654472	9 19.1	266 22 49.3	1 6 0.2	.0021321		
25	17 28 34.78	22 3 44.4	.9659380	9 15.0	266 24 37.6	1 5 56.0	.0021332		



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South.</i>	<i>°</i>	<i>h m</i>	<i>° ' "</i>	<i>North.</i>	<i>°</i>
July 25	17 28 34.78	22 3 44.4	.9659380	9 15.0	266 24 37.6	5 56.0	.0021332
26	17 28 22.50	22 3 44.6	.9664389	9 10.9	266 26 25.9	5 51.8	.0021344
27	17 28 10.55	22 3 45.1	.9669497	9 6.7	266 28 14.3	5 47.6	.0021356
28	17 27 58.94	22 3 45.8	.9674701	9 2.6	266 30 2.6	5 43.4	.0021368
29	17 27 47.66	22 3 46.9	.9679999	8 58.5	266 31 50.9	5 39.1	.0021380
30	17 27 36.72	22 3 48.2	.9685390	8 54.4	266 33 39.3	5 34.9	.0021392
31	17 27 26.14	22 3 49.9	.9690870	8 50.3	266 35 27.6	5 30.7	.0021403
Aug. 1	17 27 15.91	22 3 51.9	.9696437	8 46.2	266 37 15.9	5 26.5	.0021415
2	17 27 6.04	22 3 54.2	.9702089	8 42.1	266 39 4.2	5 22.2	.0021426
3	17 26 56.53	22 3 56.8	.9707825	8 38.0	266 40 52.6	5 18.0	.0021438
4	17 26 47.39	22 3 59.7	.9713641	8 33.9	266 42 40.9	5 13.8	.0021449
5	17 26 38.62	22 4 3.0	.9719535	8 29.9	266 44 29.2	5 9.5	.0021460
6	17 26 30.22	22 4 6.6	.9725506	8 25.8	266 46 17.5	5 5.3	.0021471
7	17 26 22.20	22 4 10.5	.9731550	8 21.7	266 48 5.8	5 1.1	.0021482
8	17 26 14.55	22 4 14.7	.9737666	8 17.7	266 49 54.1	4 56.8	.0021493
9	17 26 7.30	22 4 19.3	.9743851	8 13.6	266 51 42.4	4 52.6	.0021504
10	17 26 0.43	22 4 24.2	.9750104	8 9.6	266 53 30.7	4 48.4	.0021515
11	17 25 53.95	22 4 29.4	.9756421	8 5.5	266 55 19.0	4 44.1	.0021525
12	17 25 47.86	22 4 35.0	.9762801	8 1.5	266 57 7.3	4 39.9	.0021536
13	17 25 42.17	22 4 40.9	.9769242	7 57.5	266 58 55.6	4 35.7	.0021547
14	17 25 36.88	22 4 47.2	.9775741	7 53.5	267 0 43.9	4 31.4	.0021557
15	17 25 31.98	22 4 53.8	.9782297	7 49.5	267 2 32.2	4 27.2	.0021568
16	17 25 27.49	22 5 0.8	.9788907	7 45.5	267 4 20.5	4 22.9	.0021578
17	17 25 23.40	22 5 8.1	.9795569	7 41.5	267 6 8.7	4 18.7	.0021589
18	17 25 19.71	22 5 15.8	.9802282	7 37.5	267 7 57.0	4 14.5	.0021599
19	17 25 16.43	22 5 23.8	.9809044	7 33.5	267 9 45.3	4 10.2	.0021609
20	17 25 13.57	22 5 32.2	.9815851	7 29.5	267 11 33.6	4 6.0	.0021619
21	17 25 11.12	22 5 41.0	.9822702	7 25.5	267 13 21.9	4 1.7	.0021630
22	17 25 9.08	22 5 50.1	.9829594	7 21.6	267 15 10.2	3 57.5	.0021640
23	17 25 7.46	22 5 59.6	.9836525	7 17.6	267 16 58.4	3 53.2	.0021650
24	17 25 6.26	22 6 9.4	.9843492	7 13.7	267 18 46.7	3 49.0	.0021660
25	17 25 5.48	22 6 19.6	.9850494	7 9.7	267 20 35.0	3 44.7	.0021669
26	17 25 5.12	22 6 30.1	.9857528	7 5.8	267 22 23.3	3 40.5	.0021679
27	17 25 5.18	22 6 41.0	.9864591	7 1.8	267 24 11.5	3 36.2	.0021689
28	17 25 5.66	22 6 52.3	.9871681	6 57.9	267 25 59.8	3 32.0	.0021698
29	17 25 6.56	22 7 4.0	.9878797	6 54.0	267 27 48.1	3 27.7	.0021708
30	17 25 7.89	22 7 16.0	.9885935	6 50.1	267 29 36.3	3 23.5	.0021717
31	17 25 9.64	22 7 28.4	.9893094	6 46.2	267 31 24.6	3 19.2	.0021727
Sept. 1	17 25 11.82	22 7 41.1	.9900270	6 42.3	267 33 12.9	3 14.9	.0021736
2	17 25 14.42	22 7 54.2	.9907463	6 38.4	267 35 1.1	3 10.7	.0021745
3	17 25 17.44	22 8 7.6	.9914669	6 34.5	267 36 49.4	3 6.4	.0021754
4	17 25 20.88	22 8 21.3	.9921887	6 30.7	267 38 37.6	3 2.2	.0021763



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.			
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.	
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	
Sept.		South.	°			North.	I	
	h m s	° ' "		h m	° ' "	° ' "		
	4 17 25 20.88	22 8 21.3	.9921887	6 30.7	267 38 37.6	1 3 2.2	.0021763	
	5 17 25 24.74	22 8 35.4	.9929114	6 26.8	267 40 25.9	1 2 57.9	.0021773	
	6 17 25 29.02	22 8 49.8	.9936348	6 22.9	267 42 14.2	1 2 53.6	.0021782	
	7 17 25 33.72	22 9 4.4	.9943587	6 19.1	267 44 2.4	1 2 49.4	.0021791	
	8 17 25 38.83	22 9 19.4	.9950829	6 15.2	267 45 50.7	1 2 45.1	.0021800	
	9 17 25 44.35	22 9 34.7	.9958073	6 11.4	267 47 38.9	1 2 40.8	.0021809	
	10 17 25 50.29	22 9 50.3	.9965316	6 7.6	267 49 27.2	1 2 36.6	.0021818	
	11 17 25 56.64	22 10 6.2	.9972556	6 3.7	267 51 15.4	1 2 32.3	.0021827	
	12 17 26 3.40	22 10 22.4	.9979792	5 59.9	267 53 3.7	1 2 28.0	.0021836	
	13 17 26 10.58	22 10 38.8	.9987022	5 56.1	267 54 51.9	1 2 23.8	.0021845	
	14 17 26 18.16	22 10 55.6	.9994244	5 52.3	267 56 40.1	1 2 19.5	.0021853	
		I						
	15 17 26 26.15	22 11 12.6	.0001456	5 48.5	267 58 28.4	1 2 15.2	.0021862	
	16 17 26 34.54	22 11 29.9	.0008657	5 44.7	268 0 16.6	1 2 10.9	.0021870	
	17 17 26 43.34	22 11 47.5	.0015844	5 40.9	268 2 4.9	1 2 6.7	.0021879	
	18 17 26 52.54	22 12 5.3	.0023016	5 37.2	268 3 53.1	1 2 2.4	.0021887	
	19 17 27 2.14	22 12 23.4	.0030171	5 33.4	268 5 41.4	1 1 58.1	.0021895	
	20 17 27 12.14	22 12 41.7	.0037306	5 29.6	268 7 29.6	1 1 53.8	.0021903	
	21 17 27 22.54	22 13 0.2	.0044420	5 25.9	268 9 17.9	1 1 49.5	.0021912	
	22 17 27 33.34	22 13 18.9	.0051512	5 22.1	268 11 6.1	1 1 45.3	.0021920	
	23 17 27 44.53	22 13 37.9	.0058578	5 18.4	268 12 54.3	1 1 41.0	.0021928	
	24 17 27 56.12	22 13 57.1	.0065617	5 14.7	268 14 42.6	1 1 36.7	.0021936	
	25 17 28 8.09	22 14 16.4	.0072627	5 10.9	268 16 30.8	1 1 32.4	.0021944	
	26 17 28 20.45	22 14 36.0	.0079607	5 7.2	268 18 19.1	1 1 28.1	.0021952	
	27 17 28 33.20	22 14 55.7	.0086554	5 3.5	268 20 7.3	1 1 23.8	.0021960	
	28 17 28 46.33	22 15 15.6	.0093467	4 59.8	268 21 55.5	1 1 19.5	.0021967	
	29 17 28 59.85	22 15 35.7	.0100345	4 56.1	268 23 43.8	1 1 15.3	.0021975	
	30 17 29 13.74	22 15 56.0	.0107185	4 52.4	268 25 32.0	1 1 11.0	.0021983	
Oct.	1 17 29 27.99	22 16 16.4	.0113985	4 48.7	268 27 20.3	1 1 6.7	.0021990	
	2 17 29 42.62	22 16 36.9	.0120744	4 45.0	268 29 8.5	1 1 2.4	.0021998	
	3 17 29 57.61	22 16 57.5	.0127461	4 41.3	268 30 56.7	1 0 58.1	.0022005	
	4 17 30 12.95	22 17 18.3	.0134133	4 37.6	268 32 45.0	1 0 53.8	.0022013	
	5 17 30 28.66	22 17 39.1	.0140760	4 33.9	268 34 33.2	1 0 49.5	.0022020	
	6 17 30 44.72	22 18 0.0	.0147340	4 30.3	268 36 21.4	1 0 45.2	.0022027	
	7 17 31 1.13	22 18 21.0	.0153871	4 26.6	268 38 9.7	1 0 40.9	.0022035	
	8 17 31 17.89	22 18 42.1	.0160352	4 23.0	268 39 57.9	1 0 36.6	.0022042	
	9 17 31 34.99	22 19 3.2	.0166783	4 19.3	268 41 46.2	1 0 32.3	.0022049	
	10 17 31 52.43	22 19 24.4	.0173161	4 15.7	268 43 34.4	1 0 28.0	.0022056	
	11 17 32 10.21	22 19 45.6	.0179486	4 12.0	268 45 22.6	1 0 23.7	.0022063	
	12 17 32 28.33	22 20 6.8	.0185757	4 8.4	268 47 10.9	1 0 19.4	.0022070	
	13 17 32 46.77	22 20 28.1	.0191972	4 4.8	268 48 59.1	1 0 15.1	.0022077	
	14 17 33 5.54	22 20 49.4	.0198129	4 1.2	268 50 47.4	1 0 10.8	.0022083	
	15 17 33 24.64	22 21 10.7	.0204228	3 57.5	268 52 35.6	1 0 6.5	.0022090	



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South.</i> <i>° ' "</i>	<i>I</i>	<i>h m</i>	<i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>I</i>
Oct. 15	17 33 24.64	22 21 10.7	0204228	3 57.5	268 52 35.6	1 0 6.5	0022090
16	17 33 44.05	22 21 31.9	0210268	3 53.9	268 54 23.9	1 0 2.2	0022096
17	17 34 3.78	22 21 53.2	0216246	3 50.3	268 56 12.1	0 59 57.9	0022103
18	17 34 23.82	22 22 14.4	0222162	3 46.7	268 58 0.3	0 59 53.6	0022109
19	17 34 44.18	22 22 35.6	0228014	3 43.1	268 59 48.6	0 59 49.3	0022116
20	17 35 4.84	22 22 56.7	0233801	3 39.5	269 1 36.8	0 59 45.0	0022122
21	17 35 25.80	22 23 17.8	0239521	3 36.0	269 3 25.1	0 59 40.7	0022128
22	17 35 47.06	22 23 38.9	0245174	3 32.4	269 5 13.3	0 59 36.3	0022135
23	17 36 8.62	22 23 59.8	0250757	3 28.8	269 7 1.6	0 59 32.0	0022141
24	17 36 30.47	22 24 20.6	0256270	3 25.2	269 8 49.8	0 59 27.7	0022147
25	17 36 52.61	22 24 41.3	0261712	3 21.7	269 10 38.1	0 59 23.4	0022153
26	17 37 15.03	22 25 1.9	0267081	3 18.1	269 12 26.3	0 59 19.1	0022159
27	17 37 37.73	22 25 22.4	0272376	3 14.6	269 14 14.6	0 59 14.8	0022164
28	17 38 0.70	22 25 42.8	0277596	3 11.0	269 16 2.8	0 59 10.5	0022170
29	17 38 23.94	22 26 3.0	0282740	3 7.5	269 17 51.1	0 59 6.1	0022176
30	17 38 47.44	22 26 23.1	0287807	3 3.9	269 19 39.3	0 59 1.8	0022182
31	17 39 11.20	22 26 43.0	0292797	3 0.4	269 21 27.6	0 58 57.5	0022187
Nov. 1	17 39 35.20	22 27 2.7	0297707	2 56.9	269 23 15.8	0 58 53.2	0022193
2	17 39 59.46	22 27 22.3	0302538	2 53.3	269 25 4.1	0 58 48.8	0022198
3	17 40 23.96	22 27 41.7	0307288	2 49.8	269 26 52.3	0 58 44.5	0022204
4	17 40 48.70	22 28 0.8	0311957	2 46.3	269 28 40.6	0 58 40.2	0022209
5	17 41 13.68	22 28 19.7	0316544	2 42.8	269 30 28.9	0 58 35.9	0022214
6	17 41 38.89	22 28 38.4	0321047	2 39.3	269 32 17.1	0 58 31.5	0022219
7	17 42 4.32	22 28 56.8	0325468	2 35.8	269 34 5.4	0 58 27.2	0022224
8	17 42 29.98	22 29 15.0	0329804	2 32.2	269 35 53.7	0 58 22.9	0022229
9	17 42 55.85	22 29 33.0	0334055	2 28.7	269 37 41.9	0 58 18.6	0022234
10	17 43 21.94	22 29 50.7	0338221	2 25.2	269 39 30.2	0 58 14.2	0022239
11	17 43 48.24	22 30 8.2	0342301	2 21.7	269 41 18.5	0 58 9.9	0022243
12	17 44 14.74	22 30 25.3	0346293	2 18.3	269 43 6.8	0 58 5.6	0022248
13	17 44 41.44	22 30 42.2	0350198	2 14.8	269 44 55.0	0 58 1.2	0022253
14	17 45 8.34	22 30 58.8	0354015	2 11.3	269 46 43.3	0 57 56.9	0022258
15	17 45 35.43	22 31 15.1	0357742	2 7.8	269 48 31.6	0 57 52.6	0022263
16	17 46 2.71	22 31 31.1	0361379	2 4.3	269 50 19.9	0 57 48.2	0022267
17	17 46 30.18	22 31 46.8	0364925	2 0.8	269 52 8.1	0 57 43.9	0022272
18	17 46 57.82	22 32 2.2	0368380	1 57.4	269 53 56.4	0 57 39.5	0022276
19	17 47 25.64	22 32 17.2	0371742	1 53.9	269 55 44.7	0 57 35.2	0022280
20	17 47 53.62	22 32 31.9	0375011	1 50.4	269 57 33.0	0 57 30.9	0022284
21	17 48 21.77	22 32 46.3	0378186	1 47.0	269 59 21.3	0 57 26.5	0022288
22	17 48 50.08	22 33 0.3	0381267	1 43.5	270 1 9.5	0 57 22.2	0022292
23	17 49 18.55	22 33 14.0	0384253	1 40.0	270 2 57.8	0 57 17.8	0022296
24	17 49 47.16	22 33 27.3	0387143	1 36.6	270 4 46.1	0 57 13.5	0022300
25	17 50 15.92	22 33 40.2	0389936	1 33.1	270 6 34.4	0 57 9.2	0022304



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	<i>h m s</i>	<i>South. ° ' "</i>	<i>I</i>	<i>h m</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>I</i>
Nov. 25	17 50 15.92	22 33 40.2	0.0389936	1 33.1	270 6 34.4	0 57 9.2	0.0022304
26	17 50 44.81	22 33 52.7	0.0392633	1 29.7	270 8 22.7	0 57 4.8	0.0022308
27	17 51 13.84	22 34 4.9	0.0395233	1 26.2	270 10 11.0	0 57 0.5	0.0022311
28	17 51 42.99	22 34 16.7	0.0397734	1 22.8	270 11 59.3	0 56 56.1	0.0022315
29	17 52 12.26	22 34 28.1	0.0400137	1 19.3	270 13 47.5	0 56 51.8	0.0022319
30	17 52 41.65	22 34 39.1	0.0402441	1 15.9	270 15 35.8	0 56 47.4	0.0022322
Dec. 1	17 53 11.15	22 34 49.7	0.0404646	1 12.4	270 17 24.1	0 56 43.2	0.0022325
2	17 53 40.76	22 34 59.8	0.0406753	1 9.0	270 19 12.4	0 56 38.7	0.0022329
3	17 54 10.47	22 35 9.6	0.0408760	1 5.6	270 21 0.7	0 56 34.4	0.0022332
4	17 54 40.28	22 35 18.9	0.0410668	1 2.1	270 22 49.0	0 56 30.0	0.0022335
5	17 55 10.18	22 35 27.8	0.0412477	0 58.7	270 24 37.3	0 56 25.6	0.0022338
6	17 55 40.17	22 35 36.3	0.0414185	0 55.3	270 26 25.6	0 56 21.3	0.0022341
7	17 56 10.24	22 35 44.3	0.0415794	0 51.8	270 28 13.9	0 56 16.9	0.0022344
8	17 56 40.39	22 35 51.9	0.0417303	0 48.4	270 30 2.2	0 56 12.6	0.0022347
9	17 57 10.61	22 35 59.1	0.0418711	0 45.0	270 31 50.5	0 56 8.2	0.0022349
10	17 57 40.91	22 36 5.9	0.0420018	0 41.5	270 33 38.8	0 56 3.9	0.0022352
11	17 58 11.27	22 36 12.2	0.0421225	0 38.1	270 35 27.1	0 55 59.5	0.0022355
12	17 58 41.69	22 36 18.1	0.0422330	0 34.7	270 37 15.4	0 55 55.1	0.0022357
13	17 59 12.16	22 36 23.5	0.0423333	0 31.3	270 39 3.7	0 55 50.8	0.0022360
14	17 59 42.68	22 36 28.5	0.0424235	0 27.8	270 40 52.0	0 55 46.4	0.0022362
15	18 0 13.25	22 36 33.1	0.0425035	0 24.4	270 42 40.3	0 55 42.1	0.0022364
16	18 0 43.85	22 36 37.3	0.0425732	0 21.0	270 44 28.6	0 55 37.7	0.0022366
17	18 1 14.49	22 36 41.0	0.0426327	0 17.6	270 46 16.9	0 55 33.3	0.0022369
18	18 1 45.17	22 36 44.2	0.0426819	0 14.1	270 48 5.2	0 55 29.0	0.0022371
19	18 2 15.87	22 36 47.0	0.0427207	0 10.7	270 49 53.5	0 55 24.6	0.0022373
20	18 2 46.58	22 36 49.3	0.0427492	0 7.3	270 51 41.8	0 55 20.2	0.0022375
21	18 3 17.31	22 36 51.2	0.0427674	0 3.9	270 53 30.1	0 55 15.9	0.0022377
22	18 3 48.05	22 36 52.7	0.0427752	0 0.5	270 55 18.4	0 55 11.5	0.0022378
23	18 4 18.79	22 36 53.7	0.0427726	23 53.6	270 57 6.7	0 55 7.1	0.0022380
24	18 4 49.54	22 36 54.2	0.0427596	23 50.2	270 58 55.0	0 55 2.8	0.0022382
25	18 5 20.27	22 36 54.2	0.0427363	23 46.8	271 0 43.3	0 54 58.4	0.0022383
26	18 5 50.99	22 36 53.9	0.0427026	23 43.3	271 2 31.6	0 54 54.0	0.0022385
27	18 6 21.69	22 36 53.1	0.0426586	23 39.9	271 4 19.9	0 54 49.6	0.0022386
28	18 6 52.36	22 36 51.8	0.0426042	23 36.5	271 6 8.2	0 54 45.3	0.0022388
29	18 7 23.00	22 36 50.1	0.0425396	23 33.1	271 7 56.5	0 54 40.9	0.0022389
30	18 7 53.61	22 36 48.0	0.0424646	23 29.6	271 9 44.8	0 54 36.5	0.0022390
31	18 8 24.18	22 36 45.5	0.0423795	23 26.2	271 11 33.1	0 54 32.1	0.0022392
32	18 8 54.70	22 36 42.5	0.0422841	23 22.8	271 13 21.4	0 54 27.8	0.0022393



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m s	North. ° ' "	I	h m	° ' "	North. ° ' "	I
Jan. 1	7 28 31.81	22 23 18.7	2485143	12 42.6	109 53 19.7	0 27 44.0	2716721
5	7 27 47.69	22 24 54.2	2482827	12 26.1	109 56 18.3	0 27 45.9	2716580
9	7 27 3.14	22 26 29.3	2481747	12 9.7	109 59 17.0	0 27 47.9	2716439
13	7 26 18.50	22 28 3.3	2481904	11 53.2	110 2 15.6	0 27 49.8	2716298
17	7 25 34.09	22 29 35.5	2483290	11 36.7	110 5 14.2	0 27 51.8	2716157
21	7 24 50.22	22 31 5.4	2485893	11 20.3	110 8 12.8	0 27 53.7	2716016
25	7 24 7.21	22 32 32.3	2489698	11 3.9	110 11 11.4	0 27 55.6	2715875
29	7 23 25.34	22 33 55.7	2494680	10 47.4	110 14 10.0	0 27 57.6	2715734
Feb. 2	7 22 44.96	22 35 15.0	2500810	10 31.0	110 17 8.6	0 27 59.5	2715593
6	7 22 6.36	22 36 29.8	2508046	10 14.7	110 20 7.2	0 28 1.4	2715452
10	7 21 29.82	22 37 39.5	2516331	9 58.4	110 23 5.7	0 28 3.3	2715311
14	7 20 55.58	22 38 43.9	2525608	9 42.1	110 26 4.2	0 28 5.3	2715171
18	7 20 23.88	22 39 42.6	2535815	9 25.8	110 29 2.7	0 28 7.2	2715030
22	7 19 54.92	22 40 35.3	2546890	9 9.6	110 32 1.2	0 28 9.1	2714889
26	7 19 28.89	22 41 21.7	2558769	8 53.5	110 34 59.7	0 28 11.0	2714748
Mar. 2	7 19 5.98	22 42 1.8	2571386	8 37.4	110 37 58.2	0 28 12.9	2714608
6	7 18 46.36	22 42 35.2	2584659	8 21.3	110 40 56.7	0 28 14.9	2714467
10	7 18 30.18	22 43 1.9	2598507	8 5.3	110 43 55.2	0 28 16.8	2714327
14	7 18 17.51	22 43 21.7	2612849	7 49.4	110 46 53.7	0 28 18.7	2714187
18	7 18 8.43	22 43 34.6	2627603	7 33.5	110 49 52.3	0 28 20.6	2714047
22	7 18 2.99	22 43 40.5	2642694	7 17.7	110 52 50.8	0 28 22.5	2713907
26	7 18 1.23	22 43 39.6	2658049	7 1.9	110 55 49.4	0 28 24.4	2713767
30	7 18 3.19	22 43 31.6	2673590	6 46.2	110 58 48.0	0 28 26.3	2713627
Apr. 3	7 18 8.87	22 43 16.6	2689236	6 30.6	111 1 46.6	0 28 28.2	2713487
7	7 18 18.27	22 42 54.8	2704907	6 15.1	111 4 45.2	0 28 30.1	2713347
11	7 18 31.33	22 42 26.2	2720525	5 59.6	111 7 43.8	0 28 32.0	2713207
15	7 18 47.97	22 41 50.7	2736021	5 44.1	111 10 42.5	0 28 33.9	2713068
19	7 19 8.13	22 41 8.5	2751332	5 28.7	111 13 41.2	0 28 35.8	2712928
23	7 19 31.73	22 40 19.9	2766397	5 13.4	111 16 39.9	0 28 37.8	2712788
27	7 19 58.70	22 39 24.8	2781148	4 58.1	111 19 38.7	0 28 39.7	2712649
May 1	7 20 28.93	22 38 23.2	2795520	4 42.9	111 22 37.4	0 28 41.6	2712509
5	7 21 2.30	22 37 15.5	2809461	4 27.7	111 25 36.2	0 28 43.5	2712370
9	7 21 38.68	22 36 1.7	2822913	4 12.6	111 28 35.1	0 28 45.4	2712230
13	7 22 17.91	22 34 42.0	2835821	3 57.5	111 31 34.1	0 28 47.3	2712090
17	7 22 59.83	22 33 16.5	2848140	3 42.5	111 34 33.0	0 28 49.2	2711951
21	7 23 44.32	22 31 45.5	2859837	3 27.5	111 37 32.0	0 28 51.1	2711811
25	7 24 31.23	22 30 9.2	2870869	3 12.5	111 40 31.0	0 28 53.0	2711671
29	7 25 20.41	22 28 27.7	2881195	2 57.6	111 43 30.0	0 28 54.9	2711532
June 2	7 26 11.67	22 26 41.1	2890774	2 42.8	111 46 29.1	0 28 56.8	2711392
6	7 27 4.86	22 24 50.0	2899571	2 27.9	111 49 28.2	0 28 58.7	2711253
10	7 27 59.78	22 22 54.5	2907564	2 13.1	111 52 27.4	0 29 0.6	2711114
14	7 28 56.24	22 20 54.7	2914729	1 58.3	111 55 26.5	0 29 2.5	2710975
18	7 29 54.08	22 18 51.1	2921045	1 43.6	111 58 25.6	0 29 4.4	2710836
22	7 30 53.14	22 16 43.9	2926494	1 28.8	112 1 24.8	0 29 6.3	2710697
26	7 31 53.23	22 14 33.5	2931055	1 14.1	112 4 24.0	0 29 8.1	2710559
30	7 32 54.18	22 12 20.1	2934709	0 59.3	112 7 23.2	0 29 10.0	2710420
July 4	7 33 55.77	22 10 4.1	2937441	0 44.6	112 10 22.4	0 29 11.9	2710282



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	North.		I		North.		I
	h m s	° ' "		h m	° ' "	° ' "	
July 4	7 33 55.77	22 10 4.1	.2937441	0 44.6	112 10 22.4	0 29 11.9	.2710282
8	7 34 57.82	22 7 46.0	.2939247	0 29.9	112 13 21.6	0 29 13.8	.2710144
12	7 36 0.14	22 5 26.0	.2940124	0 15.2	112 16 20.8	0 29 15.7	.2710005
16	7 37 2.55	22 3 4.8	.2940070	{ 2.5 }	112 19 20.0	0 29 17.5	.2709867
20	7 38 4.89	22 0 42.5	.2939086	23 42.2	112 22 19.2	0 29 19.4	.2709729
24	7 39 6.98	21 58 19.7	.2937169	23 27.5	112 25 18.4	0 29 21.3	.2709592
28	7 40 8.61	21 55 56.9	.2934318	23 12.8	112 28 17.6	0 29 23.2	.2709454
Aug. 1	7 41 9.59	21 53 34.5	.2930540	22 58.1	112 31 16.8	0 29 25.1	.2709316
5	7 42 9.74	21 51 13.1	.2925848	22 43.3	112 34 16.0	0 29 26.9	.2709178
9	7 43 8.85	21 48 53.0	.2920260	22 28.6	112 37 15.2	0 29 28.8	.2709041
13	7 44 6.77	21 46 34.8	.2913794	22 13.8	112 40 14.3	0 29 30.7	.2708904
17	7 45 3.33	21 44 19.2	.2906466	21 59.0	112 43 13.4	0 29 32.6	.2708766
21	7 45 58.35	21 42 6.6	.2898294	21 44.2	112 46 12.6	0 29 34.4	.2708628
25	7 46 51.67	21 39 57.4	.2889299	21 29.3	112 49 11.7	0 29 36.3	.2708491
29	7 47 43.09	21 37 52.4	.2879509	21 14.4	112 52 10.8	0 29 38.2	.2708353
Sept. 2	7 48 32.41	21 35 51.9	.2868957	20 59.5	112 55 10.0	0 29 40.1	.2708216
6	7 49 19.49	21 33 56.6	.2857685	20 44.6	112 58 9.1	0 29 42.0	.2708079
10	7 50 4.18	21 32 7.1	.2845731	20 29.6	113 1 8.2	0 29 43.8	.2707941
14	7 50 46.33	21 30 23.6	.2833133	20 14.5	113 4 7.3	0 29 45.6	.2707804
18	7 51 25.81	21 28 46.6	.2819929	19 59.5	113 7 6.4	0 29 47.5	.2707667
22	7 52 2.45	21 27 16.9	.2806164	19 44.4	113 10 5.5	0 29 49.4	.2707530
26	7 52 36.10	21 25 55.0	.2791892	19 29.2	113 13 4.7	0 29 51.2	.2707392
30	7 53 6.64	21 24 41.3	.2777173	19 13.9	113 16 3.8	0 29 53.1	.2707255
Oct. 4	7 53 33.94	21 23 36.0	.2762067	18 58.6	113 19 3.0	0 29 54.9	.2707118
8	7 53 57.91	21 22 39.6	.2746636	18 43.2	113 22 2.2	0 29 56.8	.2706981
12	7 54 18.47	21 21 52.3	.2730941	18 27.9	113 25 1.4	0 29 58.6	.2706844
16	7 54 35.54	21 21 14.5	.2715047	18 12.5	113 28 0.7	0 30 0.5	.2706706
20	7 54 49.02	21 20 46.4	.2699023	17 56.9	113 31 0.0	0 30 2.4	.2706569
24	7 54 58.87	21 20 28.2	.2682941	17 41.3	113 33 59.3	0 30 4.3	.2706432
28	7 55 5.02	21 20 20.1	.2666880	17 25.7	113 36 58.7	0 30 6.1	.2706295
Nov. 1	7 55 7.46	21 20 22.1	.2650931	17 10.0	113 39 58.1	0 30 7.9	.2706158
5	7 55 6.22	21 20 34.1	.2635165	16 54.3	113 42 57.5	0 30 9.8	.2706021
9	7 55 1.34	21 20 55.9	.2619652	16 38.5	113 45 56.9	0 30 11.6	.2705884
13	7 54 52.83	21 21 27.5	.2604479	16 22.6	113 48 56.4	0 30 13.4	.2705747
17	7 54 40.71	21 22 8.8	.2589729	16 6.6	113 51 56.0	0 30 15.3	.2705610
21	7 54 25.08	21 22 59.2	.2575478	15 50.6	113 54 55.5	0 30 17.1	.2705474
25	7 54 6.03	21 23 58.7	.2561816	15 34.6	113 57 55.1	0 30 19.0	.2705337
29	7 53 43.71	21 25 6.5	.2548821	15 18.5	114 0 54.7	0 30 20.8	.2705200
Dec. 3	7 53 18.28	21 26 22.3	.2536571	15 2.3	114 3 54.4	0 30 22.6	.2705064
7	7 52 49.90	21 27 45.3	.2525137	14 46.1	114 6 54.1	0 30 24.5	.2704928
11	7 52 18.79	21 29 15.0	.2514582	14 29.9	114 9 53.8	0 30 26.3	.2704792
15	7 51 45.13	21 30 50.5	.2504969	14 13.6	114 12 53.5	0 30 28.2	.2704656
19	7 51 9.14	21 32 31.5	.2496364	13 57.2	114 15 53.3	0 30 30.0	.2704520
23	7 50 31.06	21 34 16.8	.2488824	13 40.9	114 18 53.0	0 30 31.8	.2704385
27	7 49 51.20	21 36 5.7	.2482398	13 24.5	114 21 52.8	0 30 33.7	.2704249
31	7 49 9.85	21 37 57.4	.2477131	13 8.1	114 24 52.6	0 30 35.5	.2704114
35	7 48 27.32	21 39 51.0	.2473051	12 51.6	114 27 52.3	0 30 37.4	.2703978



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	North.		I		South.		I
	h m s	° ' "		h m	° ' "	° ' "	
Jan. 1	4 26.52	5 356.8	.4727256	6 19.7	18 40 10.9	1 39 21.4	.4744200
5	4 29.57	5 429.7	.4737384	6 4.0	18 41 39.3	1 39 22.4	.4744193
9	4 34.69	5 515.4	.4747508	5 48.4	18 43 7.7	1 39 23.4	.4744187
13	4 41.88	5 613.8	.4757577	5 32.7	18 44 36.1	1 39 24.4	.4744181
17	4 51.10	5 724.5	.4767544	5 17.2	18 46 4.5	1 39 25.4	.4744175
21	5 2.31	5 847.3	.4777364	5 1.6	18 47 32.8	1 39 26.4	.4744169
25	5 15.48	5 1021.9	.4786993	4 46.1	18 49 1.1	1 39 27.4	.4744163
29	5 30.57	5 12 7.9	.4796390	4 30.7	18 50 29.4	1 39 28.4	.4744157
Feb. 2	5 47.51	5 14 4.9	.4805508	4 15.2	18 51 57.7	1 39 29.4	.4744151
6	6 6.25	5 16 12.4	.4814300	3 59.8	18 53 25.9	1 39 30.4	.4744145
10	6 26.69	5 18 29.7	.4822730	3 44.4	18 54 54.1	1 39 31.4	.4744139
14	6 48.75	5 20 56.4	.4830764	3 29.0	18 56 22.3	1 39 32.4	.4744133
18	7 12.33	5 23 31.8	.4838371	3 13.7	18 57 50.4	1 39 33.4	.4744128
22	7 37.36	5 26 15.3	.4845523	2 58.4	18 59 18.6	1 39 34.4	.4744122
26	8 3.74	5 29 6.2	.4852188	2 43.1	19 0 46.7	1 39 35.4	.4744116
Mar. 2	8 31.37	5 32 4.0	.4858337	2 27.8	19 2 14.8	1 39 36.4	.4744110
6	9 0.14	5 35 7.8	.4863945	2 12.6	19 3 42.9	1 39 37.3	.4744104
10	9 29.94	5 38 17.0	.4868992	1 57.4	19 5 11.0	1 39 38.3	.4744098
14	10 0.65	5 41 30.7	.4873460	1 42.2	19 6 39.1	1 39 39.3	.4744092
18	10 32.14	5 44 48.2	.4877337	1 26.9	19 8 7.2	1 39 40.3	.4744086
22	11 4.32	5 48 8.9	.4880610	1 11.7	19 9 35.2	1 39 41.3	.4744081
26	11 37.07	5 51 32.0	.4883267	0 56.6	19 11 3.2	1 39 42.3	.4744075
30	12 10.28	5 54 56.7	.4885298	0 41.4	19 12 31.3	1 39 43.2	.4744069
Apr. 3	12 43.82	5 58 22.3	.4886696	0 26.2	19 13 59.4	1 39 44.2	.4744063
7	13 17.57	6 1 48.0	.4887457	0 11.0	19 15 27.5	1 39 45.2	.4744057
11	13 51.39	6 5 13.1	.4887582	23 52.1	19 16 55.6	1 39 46.2	.4744051
15	14 25.17	6 8 36.9	.4887075	23 36.9	19 18 23.7	1 39 47.1	.4744046
19	14 58.81	6 11 58.6	.4885943	23 21.7	19 19 51.8	1 39 48.1	.4744040
23	15 32.19	6 15 17.6	.4884190	23 6.5	19 21 20.0	1 39 49.1	.4744035
27	16 5.20	6 18 33.3	.4881822	22 51.4	19 22 48.2	1 39 50.1	.4744029
May 1	16 37.71	6 21 44.9	.4878849	22 36.2	19 24 16.4	1 39 51.0	.4744024
5	17 9.61	6 24 51.6	.4875282	22 21.0	19 25 44.6	1 39 52.0	.4744018
9	17 40.79	6 27 53.0	.4871138	22 5.8	19 27 12.9	1 39 53.0	.4744013
13	18 11.13	6 30 48.5	.4866438	21 50.5	19 28 41.1	1 39 54.0	.4744008
17	18 40.55	6 33 37.4	.4861200	21 35.3	19 30 9.4	1 39 54.9	.4744003
21	19 8.95	6 36 19.1	.4855447	21 20.0	19 31 37.7	1 39 55.9	.4743997
25	19 36.24	6 38 53.2	.4849198	21 4.8	19 33 6.1	1 39 56.8	.4743992
29	20 2.31	6 41 19.1	.4842475	20 49.5	19 34 34.4	1 39 57.8	.4743986
June 2	20 27.07	6 43 36.4	.4835306	20 34.1	19 36 2.8	1 39 58.8	.4743981
6	20 50.41	6 45 44.6	.4827722	20 18.8	19 37 31.2	1 39 59.8	.4743975
10	21 12.28	6 47 43.2	.4819755	20 3.4	19 38 59.6	1 40 0.7	.4743970
14	21 32.59	6 49 31.8	.4811441	19 48.0	19 40 27.9	1 40 1.7	.4743964
18	21 51.29	6 51 10.1	.4802810	19 32.6	19 41 56.3	1 40 2.6	.4743959
22	22 8.32	6 52 37.9	.4793893	19 17.2	19 43 24.7	1 40 3.6	.4743953
26	22 23.60	6 53 54.8	.4784726	19 1.7	19 44 53.2	1 40 4.5	.4743948
30	22 37.06	6 55 0.5	.4775349	18 46.2	19 46 21.6	1 40 5.5	.4743943
July 4	22 48.67	6 55 54.8	.4765804	18 30.6	19 47 49.9	1 40 6.4	.4743938



## MEAN TIME.

Month and Day.	Geocentric.					Heliocentric.		
	Apparent Right Ascension.	Apparent Declination.	Log. of True Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.	
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	
<div>North.</div> <div><div><div>h m s</div><div>° ' "</div></div><div><div>I</div><div>h m</div><div>° ' "</div></div></div>								
July	4	1 22 48.67	6 55 54.8	.4765804	18 30.6	19 47 49.9	1 40 6.4	.4743938
	8	1 22 58.39	6 56 37.6	.4756132	18 15.0	19 49 18.3	1 40 7.4	.4743933
	12	1 23 6.20	6 57 8.7	.4746376	17 59.4	19 50 46.7	1 40 8.3	.4743928
	16	1 23 12.07	6 57 28.1	.4736578	17 43.8	19 52 15.1	1 40 9.3	.4743922
	20	1 23 16.00	6 57 35.9	.4726777	17 28.1	19 53 43.4	1 40 10.2	.4743917
Aug.	24	1 23 17.95	6 57 32.0	.4717014	17 12.4	19 55 11.7	1 40 11.1	.4743911
	28	1 23 17.94	6 57 16.4	.4707338	16 56.7	19 56 40.0	1 40 12.1	.4743906
	1	1 23 15.95	6 56 49.2	.4697797	16 41.0	19 58 8.3	1 40 13.1	.4743901
	5	1 23 12.03	6 56 10.6	.4688438	16 25.2	19 59 36.5	1 40 14.0	.4743896
	9	1 23 6.20	6 55 21.0	.4679307	16 9.3	20 1 4.8	1 40 15.0	.4743891
	13	1 22 58.51	6 54 20.6	.4670444	15 53.5	20 2 33.0	1 40 15.9	.4743886
	17	1 22 49.00	6 53 9.7	.4661889	15 37.6	20 4 1.2	1 40 16.9	.4743881
	21	1 22 37.73	6 51 48.8	.4653688	15 21.7	20 5 29.4	1 40 17.8	.4743876
	25	1 22 24.75	6 50 18.2	.4645883	15 5.7	20 6 57.5	1 40 18.8	.4743871
	29	1 22 10.14	6 48 38.5	.4638519	14 49.7	20 8 25.6	1 40 19.7	.4743866
Sept.	2	1 21 53.98	6 46 50.2	.4631638	14 33.7	20 9 53.7	1 40 20.6	.4743861
	6	1 21 36.38	6 44 54.0	.4625276	14 17.7	20 11 21.8	1 40 21.5	.4743856
	10	1 21 17.46	6 42 50.6	.4619465	14 1.7	20 12 49.9	1 40 22.5	.4743851
	14	1 20 57.33	6 40 40.7	.4614236	13 45.6	20 14 18.0	1 40 23.4	.4743847
	18	1 20 36.09	6 38 25.0	.4609619	13 29.5	20 15 46.1	1 40 24.4	.4743842
Oct.	22	1 20 13.87	6 36 4.3	.4605644	13 13.4	20 17 14.1	1 40 25.3	.4743837
	26	1 19 50.79	6 33 39.4	.4602338	12 57.3	20 18 42.1	1 40 26.2	.4743831
	30	1 19 27.02	6 31 11.3	.4599722	12 41.2	20 20 10.2	1 40 27.1	.4743826
	4	1 19 2.71	6 28 40.9	.4597812	12 25.1	20 21 38.3	1 40 28.1	.4743821
	8	1 18 38.01	6 26 9.1	.4596620	12 8.9	20 23 6.3	1 40 29.0	.4743816
	12	1 18 13.08	6 23 36.9	.4596151	11 52.8	20 24 34.4	1 40 29.9	.4743811
	16	1 17 48.06	6 21 5.1	.4596413	11 36.6	20 26 2.5	1 40 30.8	.4743807
Nov.	20	1 17 23.10	6 18 34.7	.4597407	11 20.5	20 27 30.6	1 40 31.8	.4743802
	24	1 16 58.38	6 16 6.8	.4599133	11 4.4	20 28 58.8	1 40 32.7	.4743798
	28	1 16 34.05	6 13 42.3	.4601587	10 48.2	20 30 26.9	1 40 33.6	.4743793
	1	1 16 10.28	6 11 22.2	.4604753	10 32.1	20 31 55.1	1 40 34.5	.4743789
	5	1 15 47.23	6 9 7.3	.4608612	10 16.0	20 33 23.3	1 40 35.5	.4743784
	9	1 15 25.03	6 6 58.5	.4613142	9 59.9	20 34 51.5	1 40 36.4	.4743780
	13	1 15 3.82	6 4 46.8	.4618318	9 43.8	20 36 19.7	1 40 37.3	.4743775
Dec.	17	1 14 43.75	6 3 2.9	.4624117	9 27.8	20 37 48.0	1 40 38.2	.4743771
	21	1 14 24.95	6 1 17.4	.4630511	9 11.7	20 39 16.3	1 40 39.1	.4743766
	25	1 14 7.55	5 59 41.2	.4637465	8 55.7	20 40 44.7	1 40 40.0	.4743762
	29	1 13 51.67	5 58 15.0	.4644939	8 39.7	20 42 13.0	1 40 41.0	.4743757
	3	1 13 37.41	5 56 59.4	.4652890	8 23.8	20 43 41.4	1 40 41.9	.4743753
	7	1 13 24.87	5 55 54.8	.4661271	8 7.9	20 45 9.7	1 40 42.8	.4743748
	11	1 13 14.12	5 55 1.7	.4670041	7 52.0	20 46 38.1	1 40 43.7	.4743744
	15	1 13 5.24	5 54 20.5	.4679154	7 36.1	20 48 6.5	1 40 44.6	.4743739
	19	1 12 58.29	5 53 51.6	.4688565	7 20.2	20 49 34.9	1 40 45.5	.4743735
	23	1 12 53.36	5 53 35.3	.4698225	7 4.4	20 51 3.3	1 40 46.4	.4743730
	27	1 12 50.45	5 53 31.5	.4708080	6 48.7	20 52 31.7	1 40 47.3	.4743726
	31	1 12 49.60	5 53 40.5	.4718074	6 32.9	20 54 0.1	1 40 48.2	.4743721
	35	1 12 50.82	5 54 2.2	.4728157	6 17.2	20 55 28.5	1 40 49.1	.4743717



# PARALLAXES AND SEMIDIAMETERS. 301

Equatorial Horizontal Parallaxes and Semidiameters,  
At Mean Noon.

1870.		MERCURY.		VENUS.		MARS.		JUPITER.		SATURN.		URANUS.	
		H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.
Jan.	1	6.8	2.5	16.7	15.5	3.9	2.4	2.0	22.5	0.8	7.4	0.5	2.1
	6	7.2	2.7	17.9	16.6	3.9	2.4	2.0	22.1	0.8	7.4	0.5	2.1
	11	7.8	2.9	19.3	17.9	3.8	2.4	2.0	21.8	0.8	7.4	0.5	2.1
	16	8.8	3.3	20.8	19.3	3.8	2.4	1.9	21.4	0.8	7.5	0.5	2.1
	21	10.0	3.7	22.5	20.9	3.8	2.4	1.9	21.1	0.8	7.5	0.5	2.1
Feb.	26	11.7	4.4	24.3	22.6	3.8	2.4	1.9	20.7	0.8	7.5	0.5	2.1
	31	13.2	4.9	26.3	24.4	3.8	2.4	1.8	20.4	0.8	7.6	0.5	2.1
	5	13.8	5.1	28.3	26.3	3.8	2.4	1.8	20.0	0.8	7.6	0.5	2.1
	10	13.1	4.9	30.1	28.0	3.8	2.4	1.8	19.7	0.9	7.7	0.5	2.1
	15	12.0	4.5	31.6	29.3	3.8	2.3	1.7	19.4	0.9	7.7	0.5	2.1
Mar.	20	10.9	4.1	32.4	30.1	3.8	2.3	1.7	19.1	0.9	7.8	0.5	2.1
	25	9.9	3.7	32.4	30.0	3.8	2.3	1.7	18.8	0.9	7.8	0.5	2.1
	2	9.2	3.4	31.5	29.2	3.8	2.3	1.7	18.6	0.9	7.9	0.5	2.1
	7	8.5	3.2	30.0	27.9	3.8	2.3	1.6	18.3	0.9	8.0	0.5	2.1
	12	8.0	3.0	28.1	26.1	3.8	2.3	1.6	18.1	0.9	8.0	0.5	2.0
Apr.	17	7.6	2.8	26.1	24.2	3.8	2.3	1.6	17.9	0.9	8.1	0.5	2.0
	22	7.3	2.7	24.1	22.3	3.7	2.3	1.6	17.7	0.9	8.2	0.5	2.0
	27	7.0	2.6	22.2	20.6	3.7	2.3	1.6	17.5	0.9	8.2	0.5	2.0
	1	6.8	2.5	20.5	19.0	3.7	2.3	1.6	17.4	0.9	8.3	0.5	2.0
	6	6.7	2.5	18.9	17.5	3.7	2.3	1.5	17.2	0.9	8.4	0.5	2.0
May	11	6.7	2.5	17.5	16.3	3.7	2.3	1.5	17.1	0.9	8.4	0.5	2.0
	16	6.8	2.5	16.3	15.1	3.7	2.3	1.5	16.9	0.9	8.5	0.5	2.0
	21	7.1	2.7	15.2	14.1	3.7	2.3	1.5	16.8	0.9	8.6	0.5	2.0
	26	7.6	2.9	14.3	13.2	3.7	2.3	1.5	16.7	1.0	8.6	0.5	2.0
	1	8.4	3.1	13.4	12.5	3.7	2.3	1.5	16.7	1.0	8.7	0.5	2.0
June	6	9.5	3.5	12.7	11.8	3.7	2.3	1.5	16.6	1.0	8.7	0.5	1.9
	11	10.7	4.0	12.0	11.1	3.7	2.3	1.5	16.6	1.0	8.8	0.5	1.9
	16	12.1	4.5	11.4	10.6	3.7	2.3	1.5	16.5	1.0	8.8	0.5	1.9
	21	13.7	5.1	10.8	10.1	3.7	2.3	1.5	16.5	1.0	8.9	0.5	1.9
	26	15.0	5.6	10.3	9.6	3.7	2.3	1.5	16.5	1.0	8.9	0.5	1.9
July	31	16.0	6.0	9.9	9.2	3.7	2.3	1.5	16.5	1.0	8.9	0.5	1.9
	5	16.3	6.1	9.5	8.8	3.7	2.3	1.5	16.5	1.0	9.0	0.5	1.9
	10	15.7	5.9	9.1	8.5	3.8	2.3	1.5	16.5	1.0	9.0	0.5	1.9
	15	14.6	5.4	8.8	8.1	3.8	2.3	1.5	16.6	1.0	9.0	0.5	1.9
	20	13.1	4.9	8.5	7.9	3.8	2.3	1.5	16.6	1.0	9.0	0.5	1.9
July	25	11.7	4.3	8.2	7.6	3.8	2.3	1.5	16.7	1.0	9.0	0.5	1.9
	30	10.3	3.8	7.9	7.4	3.8	2.4	1.5	16.8	1.0	9.0	0.5	1.9
	5	9.1	3.4	7.7	7.1	3.8	2.4	1.5	16.9	1.0	8.9	0.5	1.9

For Jupiter and Saturn, Polar Semid. = Equat. Semid.  $\times$  .927.



# 302 PARALLAXES AND SEMIDIAMETERS.

## Equatorial Horizontal Parallax and Semidiameters, At Mean Noon.

1870.	MERCURY.		VENUS.		MARS.		JUPITER.		SATURN.		URANUS.	
	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.	H.P.	Semid.
July	5	"	"	"	"	"	"	"	"	"	"	"
	10	9.1	3.4	7.7	7.1	3.8	2.4	1.5	16.9	1.0	8.9	0.5
	15	8.2	3.1	7.5	6.9	3.8	2.4	1.5	17.0	1.0	8.9	0.5
	20	7.5	2.8	7.3	6.7	3.9	2.4	1.6	17.1	1.0	8.9	0.5
Aug.	25	7.0	2.6	7.1	6.6	3.9	2.4	1.6	17.3	1.0	8.8	0.5
	30	6.7	2.5	6.9	6.4	3.9	2.4	1.6	17.4	1.0	8.8	0.5
	4	6.6	2.5	6.8	6.3	3.9	2.4	1.6	17.6	1.0	8.7	0.5
	9	6.7	2.5	6.6	6.1	4.0	2.5	1.6	17.8	1.0	8.7	0.5
Sept.	14	6.8	2.6	6.5	6.0	4.0	2.5	1.6	18.0	0.9	8.6	0.5
	19	7.1	2.6	6.3	5.9	4.0	2.5	1.6	18.2	0.9	8.5	0.5
	24	7.3	2.7	6.2	5.8	4.1	2.5	1.7	18.4	0.9	8.5	0.5
	29	7.7	2.9	6.1	5.7	4.1	2.6	1.7	18.7	0.9	8.4	0.5
Oct.	3	8.2	3.0	6.0	5.6	4.1	2.6	1.7	18.9	0.9	8.3	0.5
	8	8.7	3.2	5.9	5.5	4.2	2.6	1.7	19.2	0.9	8.3	0.5
	13	9.4	3.5	5.9	5.4	4.2	2.6	1.7	19.5	0.9	8.2	0.5
	18	10.2	3.8	5.8	5.4	4.3	2.7	1.8	19.8	0.9	8.1	0.5
Nov.	23	11.2	4.2	5.7	5.3	4.4	2.7	1.8	20.1	0.9	8.1	0.5
	28	12.3	4.6	5.6	5.2	4.4	2.7	1.8	20.4	0.9	8.0	0.5
	3	13.3	5.0	5.6	5.2	4.5	2.8	1.9	20.7	0.9	7.9	0.5
	8	13.6	5.1	5.5	5.1	4.6	2.8	1.9	21.0	0.9	7.9	0.5
Dec.	13	12.7	4.8	5.5	5.1	4.6	2.9	1.9	21.4	0.9	7.8	0.5
	18	11.1	4.1	5.4	5.0	4.7	2.9	1.9	21.7	0.9	7.8	0.5
	23	9.5	3.5	5.4	5.0	4.8	3.0	2.0	22.0	0.9	7.7	0.5
	28	8.3	3.1	5.4	5.0	4.9	3.1	2.0	22.3	0.8	7.7	0.5
Jan.	31	7.5	2.8	5.3	5.0	5.0	3.1	2.0	22.7	0.8	7.6	0.5
	5	7.0	2.6	5.3	4.9	5.2	3.2	2.1	23.0	0.8	7.6	0.5
	10	6.6	2.5	5.3	4.9	5.3	3.3	2.1	23.2	0.8	7.5	0.5
	15	6.4	2.4	5.3	4.9	5.4	3.4	2.1	23.5	0.8	7.5	0.5
Feb.	20	6.2	2.3	5.3	4.9	5.6	3.5	2.1	23.7	0.8	7.5	0.5
	25	6.2	2.3	5.2	4.9	5.7	3.6	2.1	23.9	0.8	7.4	0.5
	3	6.2	2.3	5.2	4.9	5.9	3.7	2.2	24.0	0.8	7.4	0.5
	7	6.2	2.3	5.2	4.9	6.1	3.8	2.2	24.2	0.8	7.4	0.5
Mar.	12	6.4	2.4	5.2	4.9	6.3	3.9	2.2	24.2	0.8	7.4	0.5
	17	6.6	2.5	5.2	4.9	6.5	4.0	2.2	24.2	0.8	7.4	0.5
	22	6.9	2.6	5.2	4.9	6.7	4.2	2.2	24.2	0.8	7.4	0.5
	27	7.3	2.7	5.2	4.9	7.0	4.3	2.2	24.2	0.8	7.4	0.5
Apr.	31	8.0	3.0	5.3	4.9	7.3	4.5	2.2	24.1	0.8	7.4	0.5
	5	9.0	3.3	5.3	4.9	7.6	4.7	2.1	23.9	0.8	7.4	0.5

For Jupiter and Saturn, Polar Semid. = Equat. Semid.  $\times$  .927.



**PLANETARY.**  
**EPHEMERIDES**  
**AT**  
**TRANSIT.**



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	s	s	South. ° ' "	South. ° ' "	"	"	"
Jan. 1	19 36 28.90	19 43 28.63	17.54	0.18	23 46 41.1	23 29 13.6	41.7	2.5	6.8
3	19 50 25.59	19 57 19.17	17.31	0.19	23 10 12.5	22 49 38.6	49.5	2.6	6.9
5	20 4 8.72	20 10 53.48	16.97	0.19	22 27 33.8	22 4 0.2	57.1	2.7	7.1
7	20 17 32.63	20 24 5.23	16.50	0.19	21 39 0.5	21 12 38.5	64.2	2.7	7.3
9	20 30 30.17	20 36 46.22	15.87	0.20	20 44 58.7	20 16 6.9	70.7	2.8	7.5
11	20 42 52.05	20 48 46.07	15.01	0.20	19 46 9.5	19 15 15.0	76.1	2.9	7.8
13	20 54 26.56	20 59 51.56	13.88	0.21	18 43 33.2	18 11 15.8	80.1	3.0	8.1
15	21 4 58.93	21 9 46.27	12.41	0.22	17 38 35.7	17 5 48.8	81.9	3.2	8.5
17	21 14 11.03	21 18 10.42	10.51	0.23	16 33 12.4	16 1 5.7	81.0	3.4	9.0
19	21 21 41.60	21 24 41.56	8.17	0.25	15 29 51.2	14 59 51.8	76.7	3.6	9.5
21	21 27 7.37	21 28 56.21	5.32	0.26	14 31 32.1	14 5 18.0	68.4	3.8	10.1
23	21 30 5.52	21 30 33.18	2.03	0.28	13 41 35.2	13 20 47.8	55.8	4.0	10.7
25	21 30 17.76	21 29 18.64	1.55	0.30	13 3 19.1	12 49 28.2	39.3	4.3	11.4
27	21 27 36.22	21 25 12.14	5.15	0.31	12 39 30.1	12 33 33.9	19.9	4.5	12.1
29	21 22 9.39	21 18 32.21	8.37	0.32	12 31 41.4	12 33 48.0	0.4	4.7	12.7
31	21 14 26.21	21 9 58.01	10.76	0.34	12 39 40.5	12 48 59.6	19.1	4.9	13.2
Feb. 2	{11 5 15.28}	20 55 36.39	{11.22}	{0.35}	{13 16 11.1}	{13 33 1.4}	{34.1}	{5.1}	{13.6}
4	20 55.88	20 46 30.44	11.42	0.35	13 51 17.4	14 10 28.4	47.0	5.1	13.8
6	20 42 25.71	20 38 46.21	9.70	0.35	14 30 4.8	14 49 41.7	49.2	5.1	13.6
8	20 35 35.33	20 32 55.31	7.32	0.34	15 8 57.0	15 27 33.4	47.4	5.0	13.3
10	20 30 47.31	20 29 11.73	4.66	0.34	15 45 16.3	16 1 55.1	43.1	4.9	13.0
12	20 28 8.25	20 27 36.02	1.99	0.33	16 17 21.6	16 31 29.5	37.0	4.7	12.6
14	20 27 33.82	20 28 0.12	0.51	0.31	16 44 14.4	16 55 33.6	30.1	4.5	12.1
16	20 28 53.30	20 30 11.67	2.75	0.30	17 5 24.8	17 13 47.1	22.8	4.3	11.6
18	20 31 53.47	20 33 56.98	4.71	0.29	17 20 39.3	17 26 1.7	15.3	4.1	11.1
20	20 36 20.58	20 39 2.69	6.38	0.28	17 29 53.9	17 32 16.4	7.8	4.0	10.7
22	20 42 1.82	20 45 16.61	7.80	0.27	17 33 9.1	17 32 33.0	0.3	3.8	10.3
24	20 48 45.75	20 52 28.07	9.00	0.26	17 30 28.3	17 26 55.9	7.0	3.7	10.0
26	20 56 22.49	21 0 27.99	10.01	0.25	17 21 56.0	17 15 29.6	14.3	3.6	9.6
28	21 4 43.64	21 9 8.65	10.85	0.24	17 7 37.2	16 58 19.5	21.5	3.5	9.3
Mar. 2	21 13 42.25	21 18 23.77	11.57	0.24	16 47 37.3	16 35 31.0	28.5	3.4	9.0
4	21 23 12.57	21 28 8.10	12.18	0.23	16 22 1.1	16 7 8.5	35.5	3.3	8.7
6	21 33 9.87	21 38 17.39	12.70	0.23	15 50 54.0	15 33 17.7	44.3	3.2	8.5
8	21 43 30.28	21 48 48.18	13.14	0.22	15 14 20.6	14 54 3.1	49.1	3.1	8.3
10	21 54 10.76	21 59 37.74	13.53	0.21	14 32 26.0	14 9 29.9	55.7	3.0	8.1
12	22 5 8.85	22 10 43.92	13.88	0.21	13 45 15.1	13 19 42.4	62.2	3.0	7.9
14	22 16 22.72	22 22 5.13	14.19	0.20	12 52 52.4	12 24 45.6	68.7	2.9	7.8
16	22 27 51.00	22 33 40.23	14.48	0.19	11 55 22.8	11 24 44.1	75.0	2.8	7.6
18	22 39 32.79	22 45 28.57	14.76	0.18	10 52 50.6	10 19 42.5	81.3	2.8	7.5
20	22 51 27.57	22 57 29.77	15.03	0.18	9 45 20.6	9 9 45.4	87.4	2.7	7.3



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid <sup>r</sup> passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	+	s	South.	South.	+	"	"
Mar. 22	23 3 35.20	23 9 43.88	15.29	0.18	8 32 57.7	0 1 1	93.5	2.7	7.2
24	23 15 55.83	23 22 11.14	15.57	0.18	7 15 47.5	7 54 58.1	99.4	2.7	7.1
26	23 28 29.88	23 34 52.16	15.85	0.18	5 53 56.1	6 35 26.4	105.2	2.6	7.0
28	23 41 18.08	23 47 47.79	16.16	0.18	4 27 31.2	5 11 17.5	110.8	2.6	6.9
30	23 54 21.40	0 0 59.08	16.48	0.18	2 56 41.6	3 42 38.8	116.2	2.6	6.9
Apr. 1	0 7 40.97	0 14 27.26	16.84	0.17	1 21 38.9	2 9 41.1	121.3	2.5	6.8
					North.	North.			
3	0 21 18.09	0 28 13.63	17.22	0.17	0 17 21.6	1 8 15.1	126.1	2.5	6.7
5	0 35 14.03	0 42 19.43	17.62	0.17	2 0 0.2	2 52 33.0	130.3	2.5	6.7
7	0 49 29.97	0 56 45.71	18.05	0.17	3 45 49.8	4 39 45.3	134.0	2.5	6.7
9	1 4 6.68	1 11 32.91	18.48	0.17	5 34 14.2	6 29 10.3	136.8	2.5	6.7
11	1 19 4.29	* * *	18.91	0.17	7 24 26.3	* * *	138.5	2.5	6.7
13	1 26 40.69	1 34 21.92	19.12	0.17	8 19 54.1	9 15 24.9	138.8	2.5	6.7
15	1 42 7.61	1 49 57.34	19.49	0.17	10 10 49.0	11 5 55.1	138.2	2.5	6.8
17	1 57 50.52	2 5 46.50	19.78	0.18	12 0 31.9	12 54 27.2	135.8	2.6	6.9
19	2 13 44.46	2 21 43.46	19.94	0.18	13 47 28.2	14 39 22.0	131.2	2.6	7.0
21	2 29 42.53	2 37 40.52	19.95	0.19	15 29 55.9	16 18 57.3	124.6	2.7	7.1
23	2 45 36.25	2 53 28.54	19.76	0.19	17 6 14.6	17 51 36.9	115.9	2.7	7.3
25	3 1 16.11	3 8 57.77	19.37	0.20	18 34 54.5	19 15 59.2	105.6	2.8	7.5
27	3 16 32.33	3 23 58.63	18.78	0.20	19 54 44.9	20 31 5.7	93.9	2.9	7.8
29	3 31 15.58	3 38 22.14	18.00	0.21	21 4 58.1	21 36 20.0	81.6	3.0	8.1
May 1	3 45 17.37	3 52 0.41	17.05	0.22	22 5 10.2	22 31 29.1	68.9	3.1	8.4
3	3 58 30.41	4 4 46.60	15.97	0.24	22 55 18.2	23 16 39.0	56.4	3.3	8.8
5	4 10 48.31	4 16 34.83	14.76	0.25	23 35 34.4	23 52 7.6	44.3	3.4	9.2
7	4 22 5.57	4 27 19.91	13.44	0.26	24 6 22.1	24 18 21.8	32.8	3.6	9.7
9	4 32 17.32	4 36 57.26	12.03	0.28	24 28 10.8	24 35 53.2	21.9	3.8	10.2
11	4 41 19.22	4 45 22.70	10.53	0.30	24 41 33.1	24 45 14.5	11.7	4.0	10.7
13	4 49 7.31	4 52 32.57	8.96	0.31	24 47 1.7	24 46 58.6	2.1	4.2	11.3
15	4 55 38.11	4 58 23.61	7.32	0.33	24 45 9.1	24 41 37.0	6.7	4.4	11.9
17	5 0 48.73	5 2 53.28	5.62	0.34	24 36 26.4	24 29 40.7	14.9	4.7	12.5
19	5 4 37.10	5 6 0.09	3.89	0.36	24 21 23.7	24 11 39.4	22.6	4.9	13.1
21	5 7 2.32	5 7 43.96	2.16	0.37	24 0 31.7	23 48 4.5	29.5	5.1	13.7
23	5 8 5.29	5 8 6.78	0.47	0.39	23 34 22.4	23 19 29.9	35.8	5.3	14.2
25	5 7 49.06	5 7 12.94	1.13	0.40	23 3 32.6	22 46 36.0	41.2	5.5	14.8
27	5 6 19.49	5 5 9.87	2.57	0.42	22 28 46.5	22 10 11.5	45.6	5.7	15.3
29	5 3 45.55	5 2 8.17	3.80	0.43	21 50 58.8	21 31 17.7	48.7	5.9	15.7
31	5 0 19.50	4 58 21.55	4.74	0.43	21 11 17.4	20 51 8.8	50.3	6.0	16.0
June 2	4 56 16.43	4 54 6.33	5.33	0.44	20 31 2.8	20 11 10.9	50.0	6.1	16.2
4	4 49 40.21	4 47 29.15	5.18	0.42	19 58 5.7	19 15 1.1	40.9	6.0	16.1
6	4 45 22.00	4 43 21.12	4.50	0.41	18 28 1.9	18 42 22.6	34.0	5.9	15.8
8	4 41 28.48	4 39 45.92	3.52	0.41	18 4 0.2	18 15 11.9	25.9	5.8	15.5
10	4 38 15.10	4 36 57.50				17 54 32.8			



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semi-d. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	" "	" "	North. ° ' "	North. ° ' "	" "	" "	" "
June 12	4 35 54.39	4 35 6.84	2.31	0.40	17 46 54.0	17 41 7.3	16.8	5.6	15.1
14	4 34 55.75	4 34 21.88	0.94	0.38	17 37 14.1	17 35 14.6	7.3	5.4	14.6
			+						
16	4 34 25.75	4 34 47.80	0.54	0.37	17 35 8.0	17 36 52.0	2.0	5.2	14.0
18	4 35 28.40	4 36 27.71	2.08	0.35	17 40 24.0	17 45 39.6	11.0	5.0	13.4
20	4 37 45.88	4 39 22.99	3.65	0.34	17 52 34.3	18 1 2.4	19.3	4.8	12.8
22	4 41 19.04	4 43 34.05	5.23	0.33	18 10 58.1	18 22 15.0	26.6	4.6	12.3
24	4 46 7.94	4 49 0.71	6.81	0.31	18 34 46.0	18 48 23.7	32.7	4.4	11.7
26	4 54 12.28	4 55 42.59	8.37	0.30	19 3 0.6	19 18 28.9	37.7	4.2	11.1
28	4 59 31.60	5 3 39.27	9.93	6.28	19 34 40.2	19 51 25.7	41.2	4.0	10.6
30	5 8 5.55	5 12 50.43	11.48	0.27	20 8 36.8	20 26 4.0	43.4	3.8	10.1
July 2	5 17 53.83	5 23 15.72	13.03	0.25	20 43 37.6	21 1 7.7	43.9	3.6	9.6
4	5 28 56.04	5 34 54.69	14.56	0.24	21 18 23.7	21 35 14.9	42.7	3.4	9.1
6	5 41 11.49	5 47 46.24	16.08	0.24	21 51 30.1	22 6 57.6	39.7	3.3	8.7
8	5 54 38.62	6 1 48.23	17.54	0.23	22 21 25.2	22 34 40.9	34.7	3.1	8.4
10	6 9 14.50	6 16 56.73	18.93	0.22	22 46 32.6	22 56 47.9	27.7	3.0	8.0
12	6 24 54.06	6 33 5.48	20.19	0.21	23 5 14.6	23 11 41.3	18.7	2.9	7.7
14	6 41 29.77	6 50 5.53	21.26	0.21	23 15 57.3	23 17 52.8	7.8	2.8	7.4
16	6 58 51.21	7 7 45.13	22.09	0.20	23 17 19.3	23 14 10.5	4.6	2.7	7.2
18	7 16 45.48	7 25 50.44	22.62	0.19	23 8 21.1	22 59 48.2	18.0	2.6	7.0
20	7 34 58.14	7 44 6.76	22.85	0.19	22 48 31.1	22 34 30.6	31.6	2.6	6.9
22	7 53 14.52	8 2 19.83	22.78	0.18	22 17 49.8	21 58 33.5	45.0	2.5	6.8
24	8 11 21.22	8 20 17.33	22.46	0.18	21 36 47.4	21 12 39.3	57.5	2.5	6.7
26	* * *	8 29 7.05	*	*	* * *	20 46 17.1	*	*	*
28	8 37 49.44	8 46 23.74	21.60	0.18	20 17 49.8	19 47 26.3	73.6	2.5	6.7
30	8 54 49.33	9 3 5.80	20.88	0.18	19 15 16.2	18 41 28.8	82.5	2.5	6.6
Aug. 1	9 11 12.81	9 19 10.21	20.09	0.18	18 6 13.1	17 29 37.8	89.9	2.5	6.7
3	9 26 57.89	9 34 35.88	19.28	0.18	16 51 51.5	16 13 2.0	95.8	2.5	6.7
5	9 42 4.25	9 49 23.12	18.48	0.18	15 33 16.8	14 52 43.1	100.4	2.5	6.7
7	9 56 32.68	10 3 33.12	17.71	0.18	14 11 27.1	13 29 35.3	104.0	2.5	6.7
9	10 10 24.66	10 17 7.57	16.97	0.18	12 47 13.3	12 4 26.3	106.5	2.5	6.8
11	10 23 42.07	10 30 8.43	16.27	0.18	11 21 19.1	10 37 56.4	108.2	2.6	6.9
13	10 36 26.91	10 42 37.75	15.61	0.18	9 54 22.4	9 10 40.9	109.1	2.6	7.0
15	10 48 41.16	10 54 37.42	14.99	0.18	8 26 55.8	7 43 10.3	109.4	2.7	7.1
17	11 0 26.71	11 6 9.22	14.41	0.18	6 59 27.9	6 15 51.6	109.2	2.7	7.2
19	11 11 45.16	11 17 14.67	13.86	0.19	5 32 24.3	4 49 8.8	108.4	2.8	7.4
21	11 22 37.89	11 27 54.95	13.34	0.19	4 6 7.8	3 23 24.0	107.2	2.8	7.5
23	11 33 5.96	11 38 10.98	12.84	0.19	2 40 59.8	1 58 58.1	105.6	2.9	7.7
25	11 43 10.08	11 48 3.28	12.34	0.19	1 17 21.1	0 36 11.4	103.5	2.9	7.8
27	11 52 50.57	11 57 31.92	11.85	0.20	0 4 28.5	0 44 35.9	101.0	3.0	8.0
29	12 2 7.27	12 6 36.56	11.35	0.20	1 24 8.3	2 3 2.9	98.1	3.1	8.2
31	12 10 59.62	12 15 16.33	10.83	0.21	2 41 17.0	3 18 47.2	94.7	3.1	8.4



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day,	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Merid. passing	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	+	"	South.	South.	—	"	"
Sept. 2	12 19 26.45	12 23 29.75	10.28	0.21	3 55 30.7	0 1 1	90.8	3.2	8.6
4	12 27 25.95	12 31 14.70	9.69	0.22	5 6 23.8	4 31 24.1	86.3	3.3	8.8
6	12 34 55.60	12 38 28.21	9.03	0.22	6 13 26.7	5 40 26.1	81.2	3.4	9.1
8	12 41 52.04	12 45 6.49	8.30	0.23	7 16 4.9	6 45 21.2	75.3	3.5	9.4
10	12 48 10.95	12 51 4.67	7.47	0.24	8 13 37.7	7 45 32.2	68.4	3.6	9.7
12	12 53 46.89	12 56 16.71	6.51	0.25	9 5 17.7	8 40 13.2	60.5	3.7	10.0
14	12 58 33.20	13 0 35.31	5.40	0.26	9 50 5.9	9 28 37.3	51.3	3.9	10.4
16	13 2 21.93	13 3 51.88	4.10	0.28	10 26 53.0	10 9 34.6	40.4	4.0	10.8
18	13 5 3.92	13 5 56.77	2.61	0.29	10 54 14.1	10 41 50.1	27.7	4.2	11.2
20	13 6 29.15	13 6 39.79	0.90	0.30	11 10 32.5	11 3 52.9	12.7	4.4	11.7
			—			11 13 58.7	+		
22	13 6 27.54	13 5 51.34	1.00	0.31	11 13 57.0	11 10 12.9	4.6	4.5	12.1
24	13 4 50.44	13 3 24.33	3.06	0.32	11 2 32.5	10 50 43.6	24.3	4.7	12.6
26	13 1 33.02	12 59 17.04	5.16	0.33	10 34 36.3	10 14 4.3	45.8	4.9	13.0
28	12 56 37.61	12 53 36.73	7.11	0.34	9 49 7.1	9 19 50.9	67.9	5.0	13.3
30	12 50 17.29	12 46 43.05	8.65	0.34	8 46 29.8	8 9 28.0	88.2	5.1	13.6
Oct. 2	12 42 58.67	12 39 21.41	9.49	0.34	7 29 19.4	6 48 48.1	103.7	5.1	13.7
4	12 31 41.31	12 28 14.86	8.96	0.33	5 18 19.2	4 34 24.7	110.9	5.0	13.4
6	12 25 8.40	12 22 27.38	7.27	0.32	3 52 9.7	3 12 35.1	102.7	4.8	12.9
8	12 20 16.44	12 18 39.21	4.78	0.31	2 36 36.0	2 4 58.2	84.8	4.6	12.4
10	12 17 38.29	12 17 15.10	1.76	0.30	1 38 18.2	1 17 0.5	60.1	4.4	11.8
			+						
12	12 17 30.03	12 18 22.55	1.41	0.28	1 1 19.1	0 51 18.6	32.1	4.1	11.1
14	12 19 51.31	12 21 54.39	4.43	0.26	0 46 54.3	0 47 55.3	4.1	3.9	10.4
16	12 24 29.41	12 27 33.67	7.09	0.25	0 54 4.1	1 5 0.4	21.5	3.7	9.8
18	12 31 4.34	12 34 58.57	9.29	0.23	1 20 20.6	1 39 39.3	43.5	3.4	9.2
20	12 39 13.62	12 43 46.81	11.02	0.22	2 2 31.5	2 28 31.8	61.3	3.2	8.7
22	12 48 35.72	12 53 38.11	12.34	0.21	2 57 15.8	3 28 20.8	74.9	3.1	8.3
24	12 58 52.02	13 4 15.65	13.29	0.20	4 1 25.2	4 36 9.5	84.9	3.0	7.9
26	13 9 47.49	13 15 26.24	13.98	0.19	5 12 15.7	5 49 27.4	91.7	2.9	7.6
28	13 21 10.77	13 27 0.12	14.46	0.19	6 27 30.3	7 6 11.8	96.0	2.8	7.4
30	13 32 53.51	13 38 50.29	14.80	0.18	7 45 20.2	8 24 45.2	98.3	2.7	7.2
Nov. 1	13 44 49.93	13 50 52.02	15.04	0.17	9 4 18.2	9 43 51.3	98.9	2.6	7.0
3	13 56 56.18	14 3 2.17	15.21	0.17	10 23 17.6	11 2 30.9	98.4	2.5	6.8
5	14 9 9.77	14 15 18.84	15.35	0.17	11 41 25.9	12 19 58.0	96.9	2.5	6.7
7	14 21 29.25	14 27 40.95	15.46	0.17	12 58 2.6	13 35 36.0	94.6	2.5	6.6
9	14 33 53.88	14 40 8.02	15.56	0.17	14 12 35.2	14 48 56.9	91.7	2.4	6.5
11	14 46 23.38	14 52 39.95	15.67	0.17	15 24 38.5	15 59 36.8	88.3	2.4	6.4
13	14 58 57.79	15 5 16.91	15.77	0.17	16 33 50.5	17 7 16.8	84.6	2.4	6.3
15	15 11 37.33	15 17 59.15	15.88	0.17	17 39 54.1	18 11 40.3	80.5	2.4	6.3
17	15 24 22.37	15 30 47.06	16.00	0.16	18 42 33.8	19 12 32.5	76.1	2.3	6.2
19	15 37 13.27	15 43 41.02	16.12	0.16	19 41 35.1	20 9 40.5	71.4	2.3	6.2
21	15 50 10.38	* * *	16.26	0.16	20 36 46.2	* * *	66.5	2.3	6.2



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid <sup>r</sup> passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	+	s	South.	South.	—	"	"
Nov. 23	15 56 41.39	16 3 14.04	16.33	0.16	21 2 51.2	21 27 53.8	63.9	2.3	6.2
25	16 9 48.40	16 16 24.45	16.47	0.17	21 51 52.8	22 14 46.5	58.6	2.3	6.2
27	16 23 2.21	16 29 41.65	16.61	0.17	22 36 33.6	22 57 12.3	53.0	2.3	6.2
29	16 36 22.80	16 43 5.64	16.75	0.17	23 16 41.7	23 34 59.9	47.3	2.3	6.2
Dec. 1	16 49 50.11	16 56 36.20	16.89	0.17	23 52 5.8	24 7 57.8	41.2	2.3	6.2
3	17 3 23.84	17 10 12.95	17.02	0.17	24 22 34.6	24 35 54.4	34.9	2.4	6.3
5	17 17 3.46	17 23 55.26	17.13	0.17	24 47 56.1	24 58 38.2	28.4	2.4	6.4
7	17 30 48.21	17 37 42.19	17.23	0.17	25 7 59.1	25 15 57.7	21.7	2.4	6.4
9	17 44 37.01	17 51 32.49	17.30	0.17	25 22 32.7	25 27 42.3	14.7	2.4	6.5
11	17 58 28.43	18 5 24.56	17.34	0.17	25 31 26.0	25 33 41.9	7.5	2.4	6.5
13	18 12 20.61	18 19 16.25	17.33	0.18	25 34 29.6	25 33 47.6	0.1	2.5	6.6
15	18 26 11.16	18 33 4.90	17.27	0.18	25 31 35.1	25 27 51.5	+		
							7.4	2.5	6.7
17	18 39 57.03	18 46 47.08	17.13	0.18	25 22 36.2	25 15 49.1	15.0	2.5	6.8
19	18 53 34.42	19 0 18.43	16.91	0.19	25 7 29.8	24 57 38.7	22.7	2.6	7.0
21	19 6 58.37	19 13 33.41	16.57	0.20	24 46 16.5	24 33 24.4	30.3	2.7	7.2
23	19 20 2.60	19 26 24.91	16.08	0.20	24 19 3.8	24 3 17.1	37.7	2.8	7.4
25	19 32 39.13	19 38 43.92	15.41	0.21	23 46 7.5	23 27 38.5	44.6	2.9	7.7
27	19 44 37.74	19 50 18.90	14.49	0.22	23 7 55.1	22 47 3.1	50.8	3.0	8.0
29	19 55 45.46	20 0 55.30	13.27	0.22	22 25 9.9	22 2 24.0	55.9	3.1	8.4
31	20 5 46.02	20 10 15.00	11.68	0.23	21 38 55.8	21 14 57.3	59.4	3.2	8.7



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Semidiameter	Hor. Par.
	h m s	h m s	+	s	South. ° ' "	South. ° ' "	+	"	"
Jan. 1	21 57 9.08	22 0 11.58	7.69	1.06	13 3 6.0	12 38 59.9	60.2	15.5	16.7
3	22 3 10.02	22 6 4.29	7.35	1.09	12 14 50.9	11 50 40.4	60.4	16.0	17.2
5	22 8 54.28	22 11 39.86	6.99	1.12	11 26 29.6	11 2 19.7	60.4	16.4	17.7
7	22 14 20.93	22 16 57.35	6.61	1.15	10 38 12.1	10 14 8.1	60.2	16.9	18.2
9	22 19 28.99	22 21 55.69	6.21	1.18	9 50 9.2	9 26 16.6	59.8	17.4	18.7
11	22 24 17.34	22 26 33.76	5.79	1.20	9 2 31.7	8 38 56.2	59.2	17.9	19.3
13	22 28 44.81	22 30 50.33	5.35	1.23	8 15 31.3	7 52 18.8	58.3	18.4	19.9
15	22 32 50.14	22 34 44.07	4.87	1.27	7 29 20.3	7 6 37.4	57.1	19.0	20.5
17	22 36 31.94	22 38 13.57	4.36	1.31	6 44 12.1	6 22 5.9	55.6	19.6	21.1
19	22 39 48.79	22 41 17.40	3.83	1.35	6 0 20.4	5 38 57.7	53.9	20.2	21.8
21	22 42 39.22	22 43 54.06	3.27	1.40	5 18 0.1	4 57 29.2	51.8	20.9	22.5
23	22 45 1.75	22 46 2.09	2.67	1.44	4 37 26.8	4 17 55.1	49.4	21.6	23.2
25	22 46 54.89	22 47 39.95	2.04	1.49	3 58 56.4	3 40 32.7	46.7	22.3	24.0
27	22 48 17.08	22 48 46.09	1.38	1.54	3 22 46.6	3 5 40.3	43.6	23.0	24.8
29	22 49 6.80	22 49 19.05	0.69	1.58	2 49 16.5	2 33 37.6	40.1	23.7	25.6
31	22 49 22.66	22 49 17.51	0.03	1.63	2 18 46.3	2 4 45.2	36.1	24.4	26.3
Feb. 2	22 49 3.45	22 48 40.39	0.77	1.68	1 51 36.8	1 39 23.9	31.7	25.2	27.1
4	22 48 8.28	22 47 27.09	1.53	1.73	1 28 9.5	1 17 55.8	26.9	25.9	27.9
6	22 46 36.85	22 45 37.64	2.28	1.78	1 8 45.4	1 0 40.7	21.6	26.6	28.7
8	22 44 29.57	22 43 12.81	3.02	1.82	0 53 44.1	0 47 57.6	15.9	27.3	29.5
10	22 41 47.60	22 40 14.25	3.72	1.87	0 43 22.9	0 40 1.6	9.9	28.0	30.2
12	22 38 33.13	22 36 44.68	4.37	1.91	0 37 54.9	0 37 3.6	3.7	28.6	30.8
14	22 34 49.46	22 32 48.05	4.93	1.94	0 37 28.1	0 39 8.2	2.6	29.1	31.3
16	22 30 41.13	22 28 29.43	5.39	1.97	0 42 3.3	0 46 12.0	8.8	29.5	31.8
18	22 26 13.72	22 23 54.87	5.72	1.99	0 51 32.6	0 58 2.6	14.8	29.8	32.2
20	22 21 33.81	22 19 11.48	5.90	2.00	1 5 38.9	1 14 18.1	20.3	30.0	32.4
22	22 14 26.44	22 12 5.68	5.90	2.01	1 34 28.6	1 45 50.8	27.4	30.1	32.5
24	22 9 47.30	22 7 32.17	5.70	2.00	1 57 57.5	2 10 43.4	31.1	30.0	32.4
26	22 5 21.15	22 3 15.01	5.36	1.99	2 24 3.0	2 37 50.9	33.9	29.8	32.1
28	22 1 14.52	21 59 20.35	4.89	1.97	2 52 1.4	3 6 28.6	35.8	29.5	31.8
Mar. 2	21 57 33.14	21 55 53.45	4.31	1.94	3 21 7.2	3 35 52.0	36.7	29.0	31.3
4	21 54 21.76	21 52 58.49	3.65	1.90	3 50 37.6	4 5 19.0	36.8	28.5	30.7
6	21 51 44.01	21 50 38.59	2.91	1.86	4 19 51.6	4 34 11.1	36.1	27.9	30.1
8	21 49 42.45	21 48 55.77	2.14	1.82	4 48 13.5	5 1 55.2	34.7	27.2	29.4
10	21 48 18.64	21 47 51.10	1.35	1.78	5 15 12.6	5 28 2.7	32.7	26.5	28.6
12	21 47 33.17	21 47 24.79	0.55	1.73	5 40 22.9	5 52 10.6	30.2	25.8	27.8
14	21 47 25.89	21 47 36.37	0.24	1.68	6 3 23.7	6 14 0.6	27.3	25.0	27.0
16	21 47 56.08	21 48 24.89	1.01	1.63	6 23 59.2	6 33 18.1	24.1	24.3	26.1
18	21 49 2.60	21 49 48.97	1.75	1.58	6 41 56.2	6 49 52.6	20.7	23.5	25.3
20	21 50 43.77	21 51 46.76	2.45	1.53	6 57 6.6	7 3 37.4	17.2	22.8	24.5
22	21 52 57.67	21 54 16.27	3.11	1.48	7 9 24.5	7 14 27.9	13.6	22.0	23.7



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid <sup>r</sup> passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	s	s	South.	South.	—	"	"
Mar. 24	21 55 42.26	21 57 15.35	3.73	1.43	7 18 47.3	7 22 22.9	9.9	21.3	23.0
	26 21 58 53.26	22 0 41.71	4.30	1.38	7 25 14.7	7 27 23.0	6.3	20.6	22.2
	28 22 2 34.45	22 4 33.22	4.82	1.34	7 28 47.9	7 29 29.6	2.6	20.0	21.5
							+		
30	22 6 37.77	22 8 47.83	5.30	1.29	7 29 28.8	7 28 45.8	0.9	19.3	20.8
Apr. 1	22 11 3.13	22 13 23.48	5.74	1.25	7 27 21.1	7 25 15.3	4.4	18.7	20.2
	3 22 15 48.64	22 18 18.38	6.14	1.21	7 22 28.7	7 19 1.8	7.8	18.1	19.6
	5 22 20 52.52	22 23 30.83	6.51	1.17	7 14 55.3	7 10 9.9	11.1	17.6	19.0
	7 22 26 13.14	22 28 59.24	6.84	1.14	7 4 46.1	6 58 44.4	14.3	17.1	18.4
	9 22 31 48.98	22 34 48.19	7.14	1.10	6 52 5.6	6 44 50.4	17.4	16.5	17.8
	11 22 37 38.69	22 40 38.34	7.42	1.07	6 36 59.4	6 28 33.1	20.4	16.0	17.3
	13 22 43 41.00	22 46 46.55	7.67	1.04	6 19 32.2	6 9 57.2	23.2	15.6	16.8
	15 22 49 54.86	22 53 5.81	7.90	1.02	5 59 49.0	5 49 8.2	26.0	15.2	16.4
	17 22 56 19.27	22 59 35.12	8.11	0.99	5 37 55.3	5 26 11.2	28.7	14.8	15.9
	19 23 2 53.26	23 6 13.57	8.30	0.96	5 13 56.4	5 1 12.0	31.2	14.3	15.5
	21 23 9 35.94	23 13 0.28	8.47	0.93	4 47 58.6	4 34 17.0	33.6	13.9	15.1
	23 23 16 26.49	23 19 54.46	8.63	0.91	4 29 7.8	4 5 31.9	35.9	13.6	14.7
	25 23 23 24.14	23 26 55.43	8.77	0.89	3 59 30.1	3 35 3.8	38.1	13.3	14.3
	27 23 30 28.27	23 34 2.59	8.90	0.86	3 19 12.1	3 2 57.5	40.1	12.9	14.0
29	23 37 38.31	23 41 15.39	9.02	0.84	2 46 19.9	2 29 20.4	42.0	12.6	13.6
May 1	23 44 53.77	23 48 35.41	9.13	0.82	2 11 59.5	1 54 18.3	43.8	12.3	13.3
	3 23 52 14.25	23 55 56.25	9.23	0.80	1 36 17.3	1 17 57.6	45.4	12.0	13.0
	5 23 59 39.39	0 3 23.63	9.32	0.78	0 59 19.5	0 40 24.0	46.9	11.8	12.7
	7 0 7 8.92	0 10 55.24	9.41	0.77	0 21 11.8	0 1 43.7	48.3	11.5	12.4
					North.	North.			
	9 0 14.42.57	0 18 30.92	9.49	0.75	0 17 59.4	0 27 57.1	49.6	11.3	12.1
	11 0 22 20.25	0 26 16.56	9.58	0.74	0 58 8.4	1 18 33.6	50.7	11.0	11.9
	13 0 30 1.84	0 33 34.08	9.66	0.72	1 39 9.9	1 59 58.6	51.8	10.8	11.6
	15 0 37 47.28	0 41 41.43	9.74	0.71	2 20 58.4	2 42 8.3	52.7	10.6	11.4
	17 0 45 36.52	0 49 32.55	9.82	0.70	3 3 27.5	3 24 55.6	53.5	10.4	11.2
	19 0 53 29.50	0 57 27.38	9.89	0.68	3 46 31.7	4 8 15.0	54.2	10.2	11.0
	21 1 1 26.18	1 5 25.90	9.97	0.67	4 30 4.9	4 52 0.4	54.7	10.0	10.7
	23 1 9 26.54	1 13 28.09	10.05	0.66	5 14 0.9	5 36 5.7	55.1	9.8	10.5
	25 1 17 30.57	1 21 33.98	10.12	0.64	5 58 14.1	6 20 25.0	55.4	9.6	10.3
	27 1 25 38.31	1 29 43.58	10.20	0.63	6 42 37.9	7 4 52.1	55.6	9.4	10.2
	29 1 33 49.80	1 37 56.95	10.28	0.62	7 27 6.8	7 49 21.1	55.6	9.3	10.0
	31 1 42 5.07	1 46 14.15	10.36	0.62	8 11 34.4	8 33 45.9	55.5	9.1	9.8
June 2	1 50 24.20	1 54 35.22	10.44	0.61	8 55 54.8	9 18 0.5	55.3	9.0	9.7
	4 1 58 47.24	2 3 0.28	10.52	0.60	9 40 2.2	10 1 59.2	55.0	8.8	9.5
	6 2 7 14.35	2 11 29.44	10.61	0.59	10 23 50.7	10 45 36.1	54.5	8.7	9.3
	8 2 15 45.60	2 20 2.84	10.70	0.58	11 7 14.7	11 28 45.7	53.9	8.5	9.2
	10 2 24 21.38	2 28 40.63	10.79	0.58	11 50 8.3	12 11 22.0	53.3	8.4	9.1
	12 2 33 1.22	2 37 22.94	10.88	0.57	12 32 26.0	12 53 19.6	52.5	8.3	8.9
	14 2 41 45.82	2 46 9.88	10.98	0.56	13 14 2.2	13 34 32.8	51.5	8.2	8.8



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>+</i>	<i>+</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>+</i>	<i>+</i>	<i>+</i>
June 16	2 50 35.11	2 55 1.54	11.08	0.55	13 54 50.9	14 14 55.6	50.5	8.0	8.7
18	2 59 29.16	3 3 57.99	11.18	0.55	14 34 46.4	14 54 22.3	49.3	7.9	8.5
20	3 8 28.04	3 12 59.31	11.28	0.54	15 13 42.8	15 32 47.0	48.0	7.8	8.4
22	3 17 31.80	3 22 5.51	11.38	0.53	15 51 34.3	16 10 3.8	46.6	7.7	8.3
24	3 26 40.46	3 31 16.63	11.48	0.53	16 28 14.9	16 46 6.7	45.1	7.6	8.2
26	3 35 54.04	3 40 32.66	11.58	0.52	17 3 38.7	17 20 50.0	43.4	7.5	8.1
28	3 45 12.50	3 49 53.55	11.69	0.52	17 37 40.1	17 54 8.3	41.6	7.4	8.0
30	3 54 35.82	3 59 19.28	11.79	0.51	18 10 13.6	18 25 55.4	39.7	7.3	7.9
July 2	4 4 3.93	4 8 49.76	11.89	0.51	18 41 13.1	18 56 6.1	37.7	7.2	7.8
4	4 13 36.77	4 18 24.95	11.98	0.50	19 10 33.7	19 24 35.3	35.6	7.1	7.7
6	4 23 14.27	4 28 4.73	12.08	0.50	19 38 10.3	19 51 17.8	33.4	7.1	7.6
8	4 32 56.32	4 37 49.03	12.17	0.49	20 3 57.3	20 16 8.4	31.1	7.0	7.5
10	4 42 42.84	4 47 37.73	12.26	0.48	20 27 50.3	20 39 2.6	28.6	6.9	7.4
12	4 52 33.66	4 57 30.62	12.35	0.48	20 49 44.7	20 59 56.0	26.1	6.8	7.4
14	5 2 28.59	5 7 27.54	12.44	0.47	21 9 35.9	21 18 44.0	23.5	6.7	7.3
16	5 12 27.44	5 17 28.25	12.52	0.47	21 27 19.7	21 35 22.6	20.8	6.7	7.2
18	5 22 29.93	5 27 32.46	12.59	0.47	21 42 52.0	21 49 47.7	18.0	6.6	7.1
20	5 32 35.78	5 37 39.88	12.65	0.47	21 56 9.2	22 1 56.0	15.2	6.5	7.1
22	5 42 44.70	5 47 50.19	12.71	0.47	22 7 7.8	22 11 44.2	12.3	6.5	7.0
24	5 52 56.30	5 58 2.99	12.77	0.46	22 15 44.8	22 19 9.3	9.3	6.4	6.9
26	6 3 10.22	6 8 17.93	12.81	0.46	22 21 57.3	22 24 8.8	6.2	6.4	6.9
28	6 13 26.06	6 18 34.58	12.85	0.45	22 25 43.3	22 26 40.7	3.2	6.3	6.8
30	6 23 43.42	6 28 52.53	12.87	0.45	22 27 0.8	22 26 43.4	0.1	6.2	6.7
Aug. 1	6 34 1.88	6 39 11.41	12.89	0.44	22 25 48.5	22 24 15.7	3.1	6.2	6.7
3	6 44 21.06	6 49 30.80	12.90	0.44	22 22 5.1	22 19 16.8	6.2	6.1	6.6
5	6 54 40.58	6 59 50.34	12.91	0.44	22 15 50.5	22 11 46.3	9.4	6.1	6.6
7	7 5 0.05	7 10 9.65	12.90	0.43	22 7 4.3	22 1 44.4	12.5	6.0	6.5
9	7 15 19.10	7 20 28.37	12.89	0.43	21 55 46.8	21 49 11.7	15.7	6.0	6.4
11	7 25 37.40	7 30 46.15	12.87	0.42	21 41 59.1	21 34 9.0	18.8	5.9	6.4
13	7 35 54.57	7 41 2.63	12.84	0.42	21 25 41.8	21 16 37.8	21.9	5.9	6.3
15	7 46 10.30	7 51 17.53	12.81	0.41	21 6 57.0	20 56 39.7	25.0	5.8	6.3
17	7 56 24.28	8 1 30.52	12.77	0.41	20 45 46.1	20 34 16.7	28.0	5.8	6.3
19	8 6 36.20	8 11 41.31	12.72	0.41	20 22 11.7	20 9 31.5	30.9	5.8	6.2
21	8 16 45.78	8 21 49.61	12.67	0.40	19 56 16.5	19 42 27.0	33.8	5.7	6.2
23	8 26 52.75	8 31 55.19	12.62	0.40	19 28 3.5	19 13 6.4	36.7	5.7	6.1
25	8 36 56.89	8 41 57.83	12.56	0.39	18 57 36.2	18 41 33.3	39.4	5.6	6.1
27	8 46 57.98	8 51 57.34	12.49	0.39	18 24 58.3	18 7 51.6	42.1	5.6	6.1
29	8 56 55.87	9 1 53.58	12.42	0.39	17 50 13.7	17 32 5.3	44.7	5.6	6.0
31	9 6 50.45	9 11 46.46	12.35	0.38	17 13 26.9	16 54 19.0	47.2	5.5	6.0
Sept. 2	9 16 41.62	9 21 35.92	12.28	0.38	16 34 42.2	16 14 37.1	49.6	5.5	5.9
4	9 26 29.35	9 31 21.93	12.21	0.38	15 54 4.2	15 33 4.3	51.9	5.5	5.9
6	9 36 13.65	9 41 4.53	12.14	0.38	15 11 37.9	14 49 45.5	54.1	5.4	5.9



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	s	s	North. ° ' "	North. ° ' "	— "	"	"
Sept. 8	9 45 54.57	9 50 43.77	12.07	0.37	14 27 27.9	14 4 45.7	56.2	5.4	5.8
10	9 55 32.15	10 0 19.73	12.00	0.37	13 41 39.5	13 18 9.9	58.2	5.4	5.8
12	10 5 6.50	10 9 52.51	11.93	0.37	12 54 17.6	12 30 3.3	60.1	5.4	5.8
14	10 14 37.74	10 19 22.23	11.87	0.37	12 5 27.6	11 40 31.1	61.9	5.3	5.8
16	10 24 5.99	10 28 49.05	11.81	0.37	11 15 14.6	10 49 38.7	63.6	5.3	5.7
18	10 33 31.42	10 38 13.13	11.75	0.36	10 23 44.2	9 57 31.7	65.1	5.3	5.7
20	10 42 54.18	10 47 34.61	11.70	0.36	9 31 2.0	9 4 15.9	66.6	5.3	5.7
22	10 52 14.45	10 56 53.72	11.65	0.35	8 37 13.8	8 9 56.5	67.9	5.2	5.6
24	11 1 32.44	11 6 10.65	11.60	0.35	7 42 25.0	7 14 39.7	69.1	5.2	5.6
26	11 10 48.36	11 15 25.62	11.56	0.35	6 46 41.4	6 18 30.8	70.2	5.2	5.6
28	11 20 2.45	11 24 38.89	11.53	0.35	5 50 8.9	5 21 36.2	71.1	5.2	5.6
30	11 29 14.96	11 33 50.70	11.50	0.34	4 52 53.4	4 24 1.4	72.0	5.2	5.5
Oct. 2	11 38 26.16	11 43 1.36	11.47	0.34	3 55 0.7	3 25 52.1	72.7	5.1	5.5
4	11 47 36.35	11 52 11.16	11.45	0.34	2 56 36.3	2 27 14.2	73.3	5.1	5.5
6	11 56 45.83	12 1 20.41	11.44	0.34	1 57 46.4	1 28 13.5	73.8	5.1	5.5
8	12 5 54.92	12 10 29.43	11.44	0.34	0 58 36.4	0 28 55.8	74.1	5.1	5.5
					South.	South.			
10	12 15 3.97	12 19 38.57	11.44	0.34	0 0 47.8	0 30 33.4	74.4	5.1	5.5
12	12 24 13.27	12 28 48.14	11.45	0.34	1 0 20.4	1 30 8.1	74.5	5.0	5.4
14	12 33 23.19	12 37 58.49	11.47	0.34	1 59 55.6	2 29 42.4	74.5	5.0	5.4
16	12 42 34.04	12 47 9.89	11.49	0.33	2 59 27.6	3 29 10.3	74.3	5.0	5.4
18	12 51 46.09	12 56 22.68	11.52	0.33	3 58 49.9	4 28 25.6	74.1	5.0	5.4
20	13 0 59.71	13 5 37.20	11.55	0.33	4 57 56.8	5 27 22.6	73.7	5.0	5.4
22	13 10 15.20	13 14 53.72	11.59	0.33	5 56 42.1	6 25 54.8	73.2	5.0	5.4
24	13 19 32.82	13 24 12.55	11.64	0.33	6 54 59.7	7 23 55.9	72.5	4.9	5.4
26	13 28 52.92	13 33 33.97	11.70	0.33	7 52 42.8	8 21 19.7	71.7	4.9	5.3
28	13 38 15.73	13 42 58.24	11.76	0.33	8 49 45.6	9 17 59.7	70.8	4.9	5.3
30	13 47 41.53	13 52 25.65	11.82	0.33	9 46 1.3	10 13 49.6	69.8	4.9	5.3
Nov. 1	13 57 10.61	14 1 56.46	11.89	0.34	10 41 23.8	11 8 43.0	68.6	4.9	5.3
3	14 6 43.24	14 11 30.97	11.97	0.34	11 35 46.5	12 2 33.6	67.3	4.9	5.3
5	14 16 19.69	14 21 9.41	12.05	0.34	12 29 3.4	12 55 15.2	65.9	4.9	5.3
7	14 26 0.17	14 30 52.01	12.14	0.34	13 21 8.0	13 46 41.1	64.3	4.9	5.3
9	14 35 44.93	14 40 38.97	12.23	0.34	14 11 53.8	14 36 45.3	62.6	4.9	5.3
11	14 45 34.17	14 50 30.52	12.32	0.34	15 1 14.7	15 25 21.3	60.8	4.9	5.3
13	14 55 28.05	15 0 26.76	12.42	0.34	15 49 4.0	16 12 22.3	58.8	4.9	5.3
15	15 5 26.69	15 10 27.83	12.52	0.34	16 35 15.3	16 57 42.3	56.7	4.9	5.3
17	15 15 30.20	15 20 33.79	12.62	0.34	17 19 42.3	17 41 14.7	54.4	4.9	5.3
19	15 25 38.61	15 30 44.68	12.73	0.34	18 2 18.5	18 22 53.1	52.0	4.9	5.3
21	15 35 51.98	15 41 0.53	12.83	0.34	18 42 57.8	19 2 31.5	49.5	4.9	5.2
23	15 46 10.29	15 51 21.24	12.93	0.34	19 21 33.8	19 40 3.6	46.9	4.9	5.2
25	15 56 33.38	16 1 46.71	13.03	0.34	19 58 0.3	20 15 23.2	44.2	4.9	5.2
27	16 7 1.20	16 12 16.83	13.13	0.35	20 32 11.5	20 48 24.5	41.3	4.9	5.2
29	16 17 33.57	16 22 51.39	13.22	0.35	21 4 1.6	21 19 2.1	38.3	4.9	5.2



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Sid. Time of passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Semidiameter.	Hor. Par.
			+		South.	South.	—		
	h m s	h m s	s	s	° ' "	° ' "	"	"	"
Dec. 1	16 28 10.29	16 33 30.23	13.31	0.35	21 33 25.4	21 47 10.8	35.2	4.9	5.2
3	16 38 51.18	16 44 13.10	13.39	0.35	22 0 17.7	22 12 45.6	32.0	4.9	5.2
5	16 49 35.95	16 54 59.71	13.47	0.35	22 24 33.9	22 35 42.1	28.7	4.9	5.2
7	* * *	* * *	*	*	* * *	* * *	*	*	*
9	17 5 49.73	17 0 24.31	13.58	0.35	22 55 56.0	22 46 9.6	23.6	4.9	5.2
11	17 16 42.81	17 11 15.91	13.63	0.36	23 13 23.7	23 5 0.9	20.1	4.9	5.2
		17 22 10.37			23 21 4.1				
13	17 27 38.54	17 33 7.27	13.69	0.36	23 28 1.7	23 34 16.2	16.5	4.9	5.2
15	17 38 36.49	17 44 6.15	13.73	0.36	23 39 47.2	23 44 34.4	12.9	4.9	5.2
17	17 49 36.20	17 55 6.57	13.76	0.36	23 48 37.6	23 51 56.6	9.2	4.9	5.2
19	18 0 37.19	18 6 7.99	13.78	0.36	23 54 31.2	23 56 21.4	5.5	4.9	5.2
21	18 11 38.92	18 17 9.90	13.79	0.36	23 57 26.8	23 57 47.5	1.8	4.9	5.2
							+		
23	18 22 40.86	18 28 11.73	13.79	0.36	23 57 23.4	23 56 14.5	1.9	4.9	5.2
25	18 33 42.44	18 39 12.94	13.78	0.36	23 54 20.9	23 51 42.6	5.7	4.9	5.3
27	18 44 43.14	18 50 12.99	13.75	0.36	23 48 19.7	23 44 12.5	9.4	4.9	5.3
29	18 55 42.42	19 1 11.36	13.72	0.36	23 39 20.8	23 33 45.1	13.1	4.9	5.3
31	19 6 39.77	19 12 7.57	13.67	0.36	23 27 25.7	23 20 22.7	16.7	4.9	5.3



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	+	s	North. ° ' "	North. ° ' "	— "	"	"
Oct. 13	9 37 37.78	9 39 55.99	5.76	0.21	15 38 36.6	15 27 57.6	26.6	3.0	4.8
15	9 42 13.64	9 44 30.74	5.78	0.21	15 17 15.5	15 6 30.5	26.2	3.0	4.8
17	9 46 47.26	9 49 3.22	5.68	0.21	14 55 42.8	14 42 58.6	27.0	3.0	4.8
19	9 51 18.61	9 53 33.43	5.63	0.21	14 33 59.9	14 23 4.9	27.2	3.0	4.9
21	9 55 47.66	9 58 1.33	5.58	0.21	14 12 7.6	14 1 8.3	27.4	3.0	4.9
23	10 0 14.41	10 2 26.90	5.53	0.22	13 50 7.3	13 39 4.6	27.6	3.1	5.0
25	10 4 38.80	10 6 50.11	5.48	0.22	13 28 0.3	13 16 34.3	27.7	3.1	5.0
27	10 9 0.83	10 11 10.96	5.43	0.22	13 5 47.4	12 54 39.1	27.8	3.1	5.0
29	10 13 20.49	10 15 29.44	5.38	0.22	12 43 29.9	12 32 19.9	27.9	3.2	5.1
31	10 17 37.79	10 19 45.55	5.34	0.22	12 21 3.1	12 9 57.6	28.0	3.2	5.1
Nov. 2	10 21 52.71	10 23 59.29	5.29	0.22	11 58 45.7	11 47 33.4	28.0	3.2	5.2
4	10 26 5.27	10 28 10.66	5.24	0.22	11 36 20.8	11 25 8.2	28.0	3.2	5.2
6	10 30 15.46	10 32 19.67	5.19	0.22	11 13 55.6	11 2 43.0	28.0	3.3	5.3
8	10 34 25.27	10 36 26.27	5.14	0.22	10 51 30.7	10 40 18.8	28.0	3.3	5.3
10	10 38 28.68	10 40 30.48	5.09	0.23	10 29 7.5	10 17 57.0	28.0	3.4	5.4
12	10 42 31.67	10 44 32.24	5.04	0.23	10 6 47.4	9 55 38.7	27.9	3.4	5.5
14	10 46 32.18	10 48 31.49	4.98	0.23	9 44 31.0	9 33 24.6	27.8	3.4	5.5
16	10 50 30.17	10 52 28.21	4.93	0.23	9 22 19.7	9 11 16.4	27.7	3.5	5.6
18	10 54 25.59	10 56 22.31	4.88	0.23	9 0 14.9	8 49 15.2	27.5	3.5	5.6
20	10 58 18.36	11 0 13.74	4.82	0.23	8 38 17.5	8 27 22.0	27.4	3.5	5.7
22	11 2 8.44	11 4 2.43	4.76	0.24	8 16 28.9	8 5 38.5	27.2	3.6	5.8
24	11 5 55.73	11 7 48.31	4.71	0.24	7 54 50.7	7 44 5.7	26.9	3.6	5.8
26	11 9 40.18	11 11 31.32	4.65	0.25	7 33 23.7	7 22 44.9	26.7	3.7	5.9
28	11 13 21.73	11 15 11.43	4.59	0.25	7 12 9.3	7 1 37.0	26.4	3.7	6.0
30	11 17 0.39	11 18 48.60	4.52	0.25	6 51 8.3	6 40 43.3	26.1	3.7	6.0
Dec. 2	11 20 36.05	11 22 22.74	4.46	0.26	6 30 22.0	6 20 4.7	25.8	3.8	6.1
4	11 24 8.66	11 25 53.81	4.40	0.26	6 9 51.5	5 59 42.6	25.5	3.8	6.2
6	11 27 38.16	11 29 21.72	4.33	0.26	5 49 37.9	5 39 37.8	25.1	3.9	6.3
8	11 31 4.46	11 32 46.38	4.26	0.27	5 29 42.3	5 19 51.6	24.7	4.0	6.4
10	11 34 27.46	11 36 7.69	4.19	0.27	5 10 5.9	5 0 25.3	24.3	4.0	6.5
12	11 37 47.06	11 39 25.54	4.12	0.27	4 50 50.1	4 41 20.3	23.9	4.1	6.5
14	11 41 3.11	11 42 39.77	4.05	0.27	4 31 56.1	4 22 37.9	23.4	4.1	6.6
16	11 44 15.48	11 45 50.24	3.97	0.28	4 13 25.7	4 4 19.7	22.9	4.2	6.7
18	11 47 24.01	11 48 56.77	3.89	0.28	3 55 20.1	3 46 27.0	22.3	4.2	6.8
20	11 50 28.50	11 51 59.19	3.80	0.28	3 37 40.8	3 29 1.6	21.8	4.3	6.9
22	11 53 28.82	11 54 57.36	3.71	0.29	3 20 29.5	3 12 4.8	21.2	4.3	7.0
24	11 56 24.79	11 57 51.10	3.62	0.29	3 3 47.6	2 55 38.0	20.6	4.4	7.1
26	11 59 16.25	12 0 40.25	3.52	0.30	2 47 36.4	2 39 42.8	19.9	4.5	7.3
28	12 3 0.6	12 3 24.66	3.42	0.30	2 31 57.3	2 24 20.1	19.2	4.6	7.4
30	12 4 45.02	12 6 4.14	3.32	0.31	2 16 51.5	2 9 31.5	18.5	4.7	7.5
32	12 7 21.98		3.22	0.31	2 2 20.5		17.8	4.7	7.6



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	s	s	North. ° ' "	North. ° ' "	+	"	"
Jan. 1	2 35 43.61	2 35 40.86	0.13	1.55	14 5 33.7	14 5 39.5	0.2	20.9	2.0
3	2 35 38.93	2 35 37.82	0.06	1.53	14 5 49.2	14 6 2.8	0.5	20.7	2.0
5	2 35 37.52	2 35 38.05	0.00	1.52	14 6 20.2	14 6 41.5	0.8	20.6	2.0
			+						
7	2 35 39.39	2 35 41.54	0.07	1.52	14 7 6.7	14 7 35.8	1.1	20.5	2.0
9	2 35 44.51	2 35 48.29	0.14	1.51	14 8 8.7	14 8 45.4	1.5	20.3	2.0
11	2 35 52.88	2 35 58.26	0.21	1.49	14 9 25.9	14 10 10.1	1.8	20.1	2.0
13	2 36 4.44	2 36 11.41	0.27	1.48	14 10 58.1	14 11 49.8	2.1	20.0	1.9
15	2 36 19.18	2 36 27.73	0.34	1.48	14 12 45.1	14 13 44.1	2.4	19.9	1.9
17	2 36 37.06	2 36 47.17	0.41	1.47	14 14 46.6	14 15 52.8	2.7	19.8	1.9
19	2 36 58.05	2 37 9.70	0.47	1.46	14 17 2.5	14 18 15.6	3.0	19.6	1.9
21	2 37 22.11	2 37 35.28	0.53	1.45	14 19 32.2	14 20 52.3	3.3	19.5	1.9
23	2 37 49.20	2 38 3.88	0.60	1.44	14 22 15.7	14 23 42.5	3.5	19.4	1.9
25	2 38 19.31	2 38 35.47	0.66	1.43	14 25 12.6	14 26 46.1	3.8	19.3	1.9
27	2 38 52.37	2 39 10.00	0.72	1.42	14 28 22.7	14 30 2.6	4.1	19.1	1.9
29	2 39 28.36	2 39 47.44	0.78	1.41	14 31 45.7	14 33 31.9	4.4	19.0	1.8
31	2 40 7.23	2 40 27.73	0.84	1.40	14 35 21.2	14 37 13.6	4.6	18.8	1.8
Feb. 2	2 40 48.94	2 41 10.84	0.90	1.39	14 39 9.0	14 41 7.3	4.9	18.7	1.8
4	2 41 33.43	2 41 56.70	0.96	1.39	14 43 8.6	14 45 12.7	5.1	18.6	1.8
6	2 42 20.65	2 42 45.26	1.01	1.38	14 47 19.5	14 49 29.1	5.3	18.5	1.8
8	2 43 10.52	2 43 36.44	1.07	1.37	14 51 41.4	14 53 56.4	5.6	18.4	1.8
10	2 44 2.99	2 44 30.18	1.12	1.36	14 56 13.9	14 58 34.0	5.8	18.3	1.8
12	2 44 58.00	2 45 26.43	1.17	1.35	15 0 56.5	15 3 21.4	6.0	18.2	1.8
14	2 45 55.48	2 46 25.13	1.22	1.34	15 5 48.7	15 8 18.2	6.2	18.1	1.7
16	2 46 55.37	2 47 26.21	1.27	1.33	15 10 50.1	15 13 24.1	6.4	17.9	1.7
18	2 47 57.64	2 48 29.63	1.32	1.32	15 16 0.3	15 18 38.6	6.6	17.8	1.7
20	2 49 2.20	2 49 35.33	1.37	1.32	15 21 19.0	15 24 1.4	6.7	17.7	1.7
22	2 50 9.02	2 50 43.27	1.42	1.31	15 26 45.7	15 29 31.9	6.9	17.6	1.7
24	2 51 18.06	2 51 53.40	1.46	1.31	15 32 20.0	15 35 9.9	7.0	17.5	1.7
26	2 52 29.27	2 53 5.66	1.51	1.30	15 38 1.6	15 40 55.1	7.2	17.4	1.7
28	2 53 42.58	2 54 20.01	1.55	1.30	15 43 50.2	15 46 46.9	7.3	17.3	1.7
Mar. 2	2 54 57.95	2 55 36.39	1.59	1.29	15 49 45.1	15 52 45.0	7.5	17.2	1.7
4	2 56 15.32	2 56 54.72	1.63	1.28	15 55 46.3	15 58 48.9	7.6	17.2	1.7
6	2 57 34.61		1.67	1.28	16 1 53.0		7.7	17.1	1.7
Aug. 10	5 18 7.65	5 18 51.51	1.84	1.31	22 31 53.1	22 32 37.7	1.9	16.8	1.6
12	5 19 34.94	5 20 17.91	1.80	1.31	22 33 21.0	22 34 3.2	1.8	16.8	1.6
14	5 21 0.43	5 21 42.48	1.76	1.32	22 34 44.2	22 35 23.9	1.7	16.9	1.6
16	5 22 24.07	5 23 5.17	1.72	1.32	22 36 2.6	22 36 40.0	1.6	17.0	1.6
18	5 23 45.79	5 24 25.91	1.68	1.33	22 37 16.3	22 37 51.5	1.5	17.1	1.7
20	5 25 5.53	5 25 44.64	1.64	1.34	22 38 25.7	22 38 58.7	1.4	17.2	1.7
22	5 26 23.22	5 27 1.28	1.60	1.35	22 39 30.7	22 40 1.7	1.3	17.2	1.7



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid <sup>r</sup> passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>"</i>	<i>"</i>	<i>° ' "</i>	<i>North. ° ' "</i>	<i>"</i>	<i>"</i>	<i>"</i>
Aug. 24	5 27 38.80	5 28 15.77	1.55	1.35	22 40 31.6	22 41 0.5	1.2	17.3	1.7
26	5 28 52.18	5 29 28.03	1.51	1.36	22 41 28.5	22 41 55.4	1.1	17.4	1.7
28	5 30 3.30	5 30 37.99	1.46	1.37	22 42 21.5	22 42 46.6	1.1	17.5	1.7
30	5 31 12.09	5 31 45.59	1.41	1.38	22 43 10.8	22 43 34.1	1.0	17.6	1.7
Sept. 1	5 32 18.49	5 32 50.79	1.36	1.38	22 43 56.4	22 44 18.0	0.9	17.7	1.7
3	5 33 22.46	5 33 53.51	1.31	1.39	22 44 38.7	22 44 58.6	0.9	17.8	1.7
5	5 34 23.93	5 34 53.72	1.26	1.40	22 45 17.7	22 45 36.1	0.8	18.0	1.7
7	5 35 22.86	5 35 51.34	1.20	1.41	22 45 53.7	22 46 10.6	0.7	18.1	1.7
9	5 36 19.16	5 36 46.31	1.15	1.42	22 46 26.9	22 46 42.4	0.7	18.2	1.8
11	5 37 12.79	5 37 38.58	1.09	1.43	22 46 57.3	22 47 11.5	0.6	18.3	1.8
13	5 38 3.69	5 38 28.09	1.03	1.43	22 47 25.0	22 47 38.0	0.6	18.4	1.8
15	5 38 51.78	5 39 14.75	0.97	1.44	22 47 50.4	22 48 2.2	0.5	18.5	1.8
17	5 39 37.00	5 39 58.52	0.91	1.45	22 48 13.4	22 48 24.1	0.5	18.6	1.8
19	5 40 19.29	5 40 39.32	0.85	1.46	22 48 34.3	22 48 43.9	0.4	18.7	1.8
21	5 40 58.58	5 41 17.08	0.79	1.47	22 48 53.0	22 49 1.6	0.4	18.8	1.8
23	5 41 34.80	5 41 51.75	0.72	1.48	22 49 9.8	22 49 17.5	0.3	18.9	1.8
25	5 42 7.91	5 42 23.26	0.66	1.49	22 49 24.8	22 49 31.7	0.3	19.1	1.8
27	5 42 37.82	5 42 51.58	0.59	1.50	22 49 38.1	22 49 44.2	0.3	19.2	1.9
29	5 43 4.52	5 43 16.65	0.52	1.51	22 49 49.9	22 49 55.2	0.2	19.4	1.9
Oct. 1	5 43 27.96	5 43 38.45	0.45	1.52	22 50 0.2	22 50 4.8	0.2	19.5	1.9
3	5 43 48.11	5 43 56.94	0.39	1.53	22 50 9.0	22 50 13.0	0.2	19.6	1.9
5	5 44 4.93	5 44 12.09	0.32	1.54	22 50 16.6	22 50 20.0	0.1	19.7	1.9
7	5 44 18.40	5 44 23.87	0.25	1.55	22 50 23.1	22 50 25.9	0.1	19.8	1.9
9	5 44 28.48	5 44 32.24	0.17	1.56	22 50 28.4	22 50 30.6	0.1	19.9	1.9
11	5 44 35.14	5 44 37.19	0.10	1.56	22 50 32.5	22 50 34.2	0.1	20.0	1.9
13	5 44 38.36	5 44 38.68	0.03	1.57	22 50 35.7	22 50 36.8	0.1	20.1	2.0
15	5 44 38.12	5 44 36.69	0.04	1.58	22 50 37.7	22 50 38.4	0.0	20.3	2.0
17	5 44 34.39	5 44 31.21	0.11	1.59	22 50 38.7	22 50 38.8	0.0	20.4	2.0
19	5 44 27.16	5 44 22.24	0.19	1.60	22 50 38.7	22 50 38.3	0.0	20.6	2.0
21	5 44 16.44	5 44 9.77	0.26	1.61	22 50 37.6	22 50 36.7	0.0	20.7	2.0
23	5 44 2.22	5 43 53.80	0.33	1.62	22 50 35.5	22 50 34.0	0.1	20.8	2.0
25	5 43 44.52	5 43 34.38	0.40	1.63	22 50 32.3	22 50 30.3	0.1	20.9	2.0
27	5 43 23.39	5 43 11.54	0.48	1.64	22 50 28.0	22 50 25.4	0.1	21.0	2.0
29	5 42 58.85	5 42 45.34	0.55	1.65	22 50 22.4	22 50 19.2	0.1	21.1	2.0
31	5 42 30.99	5 42 15.82	0.62	1.66	22 50 15.6	22 50 11.7	0.2	21.2	2.1
Nov. 2	5 41 59.85	5 41 43.07	0.68	1.67	22 50 7.5	22 50 2.9	0.2	21.3	2.1
4	5 41 25.50	5 41 7.14	0.75	1.67	22 49 58.0	22 49 52.7	0.2	21.4	2.1
6	5 40 48.01	5 40 28.12	0.81	1.68	22 49 47.1	22 49 41.1	0.2	21.5	2.1
8	5 40 7.47	5 39 46.08	0.88	1.69	22 49 34.8	22 49 28.0	0.3	21.6	2.1
10	5 39 23.97	5 39 1.13	0.94	1.69	22 49 20.9	22 49 13.3	0.3	21.7	2.1
12	5 38 37.59	5 38 13.35	1.00	1.70	22 49 5.3	22 48 56.8	0.3	21.8	2.1
14	5 37 48.44	5 37 22.87	1.05	1.71	22 48 47.9	22 48 38.4	0.4	21.9	2.1



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
Nov. 16	<sup>h m s</sup> 5 36 56.65	<sup>h m s</sup> 5 36 29.80	— 1' 11	<sup>s</sup> 1' 72	<i>North.</i> 22 48 28.5	<i>North.</i> 22 48 18.1	— 0.4	— 22.0	— 2.1
	18 5 36 2.34	5 35 34.29	1' 16	1' 72	22 48 7.1	22 47 55.7	0.5	22.1	2.1
	20 5 35 5.66	5 34 36.48	1' 20	1' 72	22 47 43.7	22 47 31.2	0.5	22.1	2.1
	22 5 34 6.76	5 33 36.53	1' 25	1' 73	22 47 18.2	22 47 4.7	0.6	22.2	2.1
	24 5 33 5.81	5 32 34.63	1' 29	1' 73	22 46 50.7	22 46 36.1	0.6	22.2	2.2
	26 5 32 3.00	5 31 30.96	1' 33	1' 74	22 46 21.0	22 46 5.3	0.6	22.3	2.2
	28 5 30 58.52	5 30 25.73	1' 36	1' 74	22 45 49.1	22 45 32.4	0.7	22.3	2.2
	30 5 29 52.59	5 29 19.13	1' 39	1' 74	22 45 15.2	22 44 57.5	0.7	22.3	2.2
	Dec. 2 5 28 45.38	5 28 11.36	1' 41	1' 74	22 44 39.2	22 44 20.5	0.8	22.3	2.2
	4 5 27 37.10	5 27 2.62	1' 43	1' 75	22 44 1.3	22 43 41.6	0.8	22.4	2.2
	6 5 26 27.95	5 25 53.11	1' 45	1' 75	22 43 21.5	22 43 0.8	0.9	22.4	2.2
	8 5 25 18.13	5 24 43.04	1' 46	1' 75	22 42 39.8	22 42 18.3	0.9	22.4	2.2
Dec. 10	5 24 7.86	5 23 32.62	1' 47	1' 75	22 41 56.3	22 41 33.9	0.9	22.4	2.2
	12 5 22 57.34	5 22 22.06	1' 47	1' 75	22 41 11.1	22 40 48.0	1.0	22.4	2.2
	14 5 21 46.78	5 21 11.55	1' 47	1' 75	22 40 24.5	22 40 0.7	1.0	22.4	2.2
	16 5 20 36.40	5 20 1.34	1' 46	1' 75	22 39 36.6	22 39 12.2	1.0	22.4	2.2
	18 5 19 26.40	5 18 51.62	1' 45	1' 75	22 38 47.6	22 38 22.8	1.0	22.4	2.2
	20 5 18 17.02	5 17 42.63	1' 44	1' 75	22 37 57.8	22 37 32.6	1.1	22.4	2.2
	22 5 17 8.47	5 16 34.58	1' 42	1' 75	22 37 7.4	22 36 42.1	1.1	22.4	2.2
	24 5 16 0.98	5 15 27.70	1' 39	1' 74	22 36 16.7	22 35 51.4	1.1	22.3	2.2
	26 5 14 54.76	5 14 22.19	1' 36	1' 74	22 35 26.1	22 35 0.8	1.1	22.3	2.2
	28 5 13 50.01	5 13 18.25	1' 33	1' 74	22 34 35.7	22 34 10.7	1.0	22.3	2.2
	30 5 12 46.93	5 12 16.07	1' 30	1' 74	22 33 45.9	22 33 21.3	1.0	22.3	2.1
	32 5 11 45.69		1' 26	1' 73	22 32 57.0		1.0	22.2	2.1



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and; Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semi- passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	+	"	South.	South.	—	"	"
Feb. 15	17 45 6.04	17 45 25.51	0.82	0.55	22 10 58.9	22 11 3.5	0.2	7.1	0.9
17	17 45 44.67	17 46 3.50	0.79	0.55	22 11 7.8	22 11 11.7	0.2	7.1	0.9
19	17 46 22.01	17 46 40.18	0.77	0.56	22 11 15.4	22 11 18.8	0.1	7.2	0.9
21	17 46 58.03	17 47 15.52	0.74	0.56	22 11 21.9	22 11 24.7	0.1	7.2	0.9
23	17 47 32.68	17 47 49.49	0.71	0.56	22 11 27.2	22 11 29.5	0.1	7.2	0.9
25	17 48 5.94	17 48 22.04	0.68	0.56	22 11 31.5	22 11 33.2	0.1	7.2	0.9
27	17 48 37.78	17 48 53.15	0.65	0.57	22 11 34.7	22 11 36.0	0.1	7.3	0.9
Mar. 1	17 49 8.16	17 49 22.79	0.62	0.57	22 11 37.0	22 11 37.8	0.0	7.3	0.9
3	17 49 37.05	17 49 50.93	0.59	0.57	22 11 38.3	22 11 38.5	0.0	7.3	0.9
5	17 50 4.43	17 50 17.54	0.55	0.57	22 11 38.6	22 11 38.6	0.0	7.3	0.9
7	17 50 30.27	17 50 42.61	0.52	0.58	22 11 38.3	22 11 38.0	0.0	7.4	0.9
9	17 50 54.56	17 51 6.11	0.49	0.58	22 11 37.4	22 11 36.7	0.0	7.4	0.9
11	17 51 17.27	17 51 28.03	0.46	0.58	22 11 35.7	22 11 34.6	0.0	7.4	0.9
13	17 51 38.39	17 51 48.35	0.42	0.58	22 11 33.3	22 11 32.0	0.1	7.4	0.9
15	17 51 57.90	17 52 7.05	0.39	0.58	22 11 30.4	22 11 28.7	0.1	7.5	0.9
17	17 52 15.80	17 52 24.13	0.36	0.58	22 11 26.9	22 11 25.0	0.1	7.5	0.9
19	17 52 32.05	17 52 39.56	0.32	0.58	22 11 23.0	22 11 20.9	0.1	7.5	0.9
21	17 52 46.65	17 52 53.33	0.29	0.58	22 11 18.7	22 11 16.4	0.1	7.5	0.9
23	17 52 59.58	17 53 5.42	0.25	0.59	22 11 14.0	22 11 11.5	0.1	7.6	0.9
25	17 53 10.83	17 53 15.82	0.22	0.59	22 11 9.0	22 11 6.4	0.1	7.6	0.9
27	17 53 20.38	17 53 24.52	0.18	0.59	22 11 3.6	22 11 0.8	0.1	7.6	0.9
29	17 53 28.22	17 53 31.50	0.15	0.59	22 10 58.0	22 10 55.0	0.1	7.6	0.9
31	17 53 34.36	17 53 36.78	0.11	0.60	22 10 52.0	22 10 49.0	0.1	7.7	0.9
Apr. 2	17 53 38.77	17 53 40.33	0.07	0.60	22 10 45.9	22 10 42.8	0.1	7.7	0.9
4	17 53 41.47	17 53 42.18	0.04	0.60	22 10 39.6	22 10 36.4	0.1	7.8	0.9
6	17 53 42.45	17 53 42.31	0.00	0.60	22 10 33.2	22 10 30.0	0.1	7.8	0.9
8	17 53 41.73	17 53 40.74	0.03	0.60	22 10 26.7	22 10 23.3	0.1	7.8	0.9
10	17 53 39.32	17 53 37.48	0.07	0.60	22 10 20.0	22 10 16.6	0.1	7.8	0.9
12	17 53 35.23	17 53 32.56	0.10	0.61	22 10 13.3	22 10 9.9	0.1	7.9	0.9
14	17 53 29.47	17 53 25.97	0.14	0.61	22 10 6.5	22 10 3.0	0.1	7.9	0.9
16	17 53 22.05	17 53 17.73	0.17	0.61	22 9 59.6	22 9 56.2	0.1	7.9	0.9
18	17 53 13.00	17 53 7.87	0.21	0.61	22 9 52.7	22 9 49.3	0.1	7.9	0.9
20	17 53 2.33	17 52 56.38	0.24	0.62	22 9 45.8	22 9 42.3	0.1	8.0	0.9
22	17 52 50.04	17 52 43.30	0.27	0.62	22 9 38.8	22 9 35.3	0.1	8.0	0.9
24	17 52 36.16	17 52 28.63	0.31	0.62	22 9 31.8	22 9 28.3	0.1	8.0	1.0
26	17 52 20.72	17 52 12.41	0.34	0.62	22 9 24.7	22 9 21.1	0.1	8.0	1.0
28	17 52 3.73	17 51 54.67	0.37	0.62	22 9 17.5	22 9 13.9	0.2	8.1	1.0
30	17 51 45.25	17 51 35.45	0.40	0.62	22 9 10.3	22 9 6.7	0.2	8.1	1.0
May 1	17 51 25.30	17 51 14.78	0.43	0.62	22 9 3.0	22 8 59.3	0.2	8.1	1.0
4	17 51 3.92	17 50 52.72	0.46	0.62	22 8 55.6	22 8 51.8	0.2	8.1	1.0
6	17 50 41.17	17 50 29.30	0.49	0.63	22 8 48.1	22 8 44.4	0.2	8.2	1.0
8	17 50 17.10	17 50 4.58	0.51	0.63	22 8 40.6	22 8 36.8	0.2	8.2	1.0



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Merid. passing	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in Hour of Long.	Semidiameter.	Hor. Par.
May 10	h m s	h m s	s	s	South.		+	"	"
					° ' "	° ' "			
10	17 49 51.74	17 49 38.60	0.54	0.63	22 8 33.1	22 8 29.3	0.2	8.2	1.0
12	17 49 25.15	17 49 11.41	0.57	0.63	22 8 25.4	22 8 21.5	0.2	8.2	1.0
14	17 48 57.38	17 48 43.07	0.59	0.64	22 8 17.6	22 8 13.6	0.2	8.3	1.0
16	17 48 28.48	17 48 13.62	0.61	0.64	22 8 9.6	22 8 5.6	0.2	8.3	1.0
18	17 47 58.49	17 47 43.11	0.64	0.64	22 8 1.5	22 7 57.4	0.2	8.3	1.0
20	17 47 27.48	17 47 11.61	0.66	0.64	22 7 53.3	22 7 49.2	0.2	8.3	1.0
22	17 46 55.50	17 46 39.17	0.68	0.64	22 7 45.0	22 7 40.7	0.2	8.3	1.0
24	17 46 22.62	17 46 5.85	0.69	0.64	22 7 36.5	22 7 32.2	0.2	8.3	1.0
26	17 45 48.89	17 45 31.73	0.71	0.64	22 7 27.8	22 7 23.5	0.2	8.3	1.0
28	17 45 14.39	17 44 56.87	0.73	0.64	22 7 19.0	22 7 14.6	0.2	8.3	1.0
30	17 44 39.19	17 44 21.34	0.74	0.64	22 7 10.1	22 7 5.5	0.2	8.3	1.0
June 1	17 44 3.35	17 43 45.22	0.75	0.64	22 7 0.9	22 6 56.3	0.2	8.3	1.0
3	17 43 26.06	17 43 8.58	0.76	0.65	22 6 51.6	22 6 46.9	0.2	8.3	1.0
5	17 42 50.10	17 42 31.51	0.77	0.65	22 6 42.2	22 6 37.5	0.2	8.3	1.0
7	17 42 12.84	17 41 54.08	0.78	0.65	22 6 32.7	22 6 27.8	0.2	8.3	1.0
9	17 41 35.26	17 41 16.37	0.79	0.65	22 6 23.1	22 6 18.3	0.2	8.3	1.0
11	17 40 57.43	17 40 38.44	0.79	0.65	22 6 13.5	22 6 8.7	0.2	8.3	1.0
13	17 40 19.42	17 40 0.37	0.79	0.65	22 6 3.8	22 5 58.9	0.2	8.3	1.0
15	17 39 41.30	17 39 22.23	0.79	0.65	22 5 54.1	22 5 49.2	0.2	8.3	1.0
17	17 39 3.15	17 38 44.09	0.79	0.65	22 5 44.4	22 5 39.6	0.2	8.3	1.0
19	17 38 25.04	17 38 6.03	0.79	0.65	22 5 34.9	22 5 30.0	0.2	8.3	1.0
21	17 37 47.05	17 37 28.12	0.79	0.65	22 5 25.3	22 5 20.5	0.2	8.3	1.0
23	17 37 9.26	17 36 50.45	0.79	0.65	22 5 15.8	22 5 11.1	0.2	8.3	1.0
25	17 36 31.73	17 36 13.09	0.78	0.65	22 5 6.5	22 5 1.9	0.2	8.3	1.0
27	17 35 54.54	17 35 36.11	0.77	0.65	22 4 57.4	22 4 53.0	0.2	8.3	1.0
29	17 35 17.79	17 34 59.59	0.76	0.65	22 4 48.6	22 4 44.3	0.2	8.3	1.0
July 1	17 34 41.53	17 34 23.62	0.75	0.64	22 4 40.1	22 4 36.0	0.2	8.3	1.0
3	17 34 5.86	17 33 48.27	0.74	0.64	22 4 32.0	22 4 28.1	0.2	8.3	1.0
5	17 33 30.84	17 33 13.60	0.72	0.64	22 4 24.3	22 4 20.7	0.2	8.3	1.0
7	17 32 56.54	17 32 39.67	0.71	0.64	22 4 17.2	22 4 13.8	0.1	8.3	1.0
9	17 32 23.01	17 32 6.56	0.69	0.64	22 4 10.7	22 4 7.6	0.1	8.3	1.0
11	17 31 50.33	17 31 34.33	0.67	0.64	22 4 4.7	22 4 2.0	0.1	8.3	1.0
13	17 31 18.57	17 31 3.04	0.65	0.64	22 3 59.4	22 3 57.0	0.1	8.3	1.0
15	17 30 47.76	17 30 32.73	0.63	0.64	22 3 54.8	22 3 52.8	0.1	8.3	1.0
17	17 30 17.96	17 30 3.46	0.61	0.63	22 3 50.9	22 3 49.3	0.1	8.2	1.0
19	17 29 49.24	17 29 35.29	0.59	0.63	22 3 47.9	22 3 46.7	0.1	8.2	1.0
21	17 29 21.63	17 29 8.27	0.56	0.63	22 3 45.8	22 3 45.1	0.0	8.2	1.0
23	17 28 55.20	17 28 42.45	0.54	0.63	22 3 44.6	22 3 44.4	0.0	8.2	1.0
25	17 28 30.01	17 28 17.89	0.51	0.63	22 3 44.5	22 3 44.8	0.0	8.2	1.0
27	17 28 6.10	17 27 54.65	0.48	0.63	22 3 45.3	22 3 46.2	—	8.2	1.0
29	17 27 43.53	17 27 32.76	0.46	0.62	22 3 47.4	22 3 48.9	0.1	8.1	1.0
31	17 27 22.34	17 27 12.26	0.43	0.62	22 3 50.6	22 3 52.7	0.1	8.1	1.0



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in Hour of Long.	Semidiameter.	Hor. Par.
	h m s	h m s	s	s	South. ° ' "	South. ° ' "	"	"	"
Aug. 2	17 27 2.55	17 26 53.20	0.40	0.62	22 3 55.1	22 3 57.8	0.1	8.1	1.0
4	17 26 44.22	17 26 35.60	0.37	0.62	22 4 0.9	22 4 4.3	0.1	8.1	1.0
6	17 26 27.36	17 26 19.49	0.34	0.62	22 4 8.0	22 4 12.0	0.2	8.0	1.0
8	17 26 12.00	17 26 4.90	0.30	0.62	22 4 16.3	22 4 20.9	0.2	8.0	1.0
10	17 25 58.18	17 25 51.85	0.27	0.62	22 4 25.9	22 4 31.3	0.2	8.0	0.9
12	17 25 45.91	17 25 40.37	0.24	0.62	22 4 37.0	22 4 43.0	0.2	8.0	0.9
14	17 25 35.22	17 25 30.47	0.21	0.61	22 4 49.4	22 4 56.1	0.3	7.9	0.9
16	17 25 26.12	17 25 22.17	0.17	0.61	22 5 3.2	22 5 10.6	0.3	7.9	0.9
18	17 25 18.62	17 25 15.49	0.14	0.61	22 5 18.3	22 5 26.5	0.3	7.9	0.9
20	17 25 12.76	17 25 10.44	0.10	0.61	22 5 35.0	22 5 43.8	0.4	7.9	0.9
22	17 25 8.54	17 25 7.05	0.07	0.60	22 5 53.0	22 6 2.5	0.4	7.8	0.9
24	17 25 5.98	17 25 5.32	0.04	0.60	22 6 12.4	22 6 22.7	0.4	7.8	0.9
26	17 25 5.09	17 25 5.27	0.00	0.60	22 6 33.3	22 6 44.3	0.5	7.8	0.9
			+						
28	17 25 5.88	17 25 6.90	0.04	0.60	22 6 55.7	22 7 7.4	0.5	7.8	0.9
30	17 25 8.35	17 25 10.22	0.07	0.59	22 7 19.5	22 7 31.9	0.5	7.7	0.9
Sept. 1	17 25 12.50	17 25 15.21	0.10	0.59	22 7 44.7	22 7 57.8	0.5	7.7	0.9
3	17 25 18.34	17 25 21.89	0.14	0.59	22 8 11.3	22 8 25.1	0.6	7.7	0.9
5	17 25 25.85	17 25 30.23	0.17	0.59	22 8 39.2	22 8 53.7	0.6	7.7	0.9
7	17 25 35.02	17 25 40.23	0.21	0.59	22 9 8.4	22 9 23.4	0.6	7.6	0.9
9	17 25 45.85	17 25 51.87	0.24	0.59	22 9 38.7	22 9 54.3	0.6	7.6	0.9
11	17 25 58.31	17 26 5.16	0.28	0.59	22 10 10.3	22 10 26.5	0.7	7.6	0.9
13	17 26 12.41	17 26 20.08	0.31	0.59	22 10 43.0	22 10 59.7	0.7	7.6	0.9
15	17 26 28.14	17 26 36.61	0.34	0.58	22 11 16.8	22 11 34.1	0.7	7.5	0.9
17	17 26 45.48	17 26 54.75	0.38	0.58	22 11 51.7	22 12 9.5	0.7	7.5	0.9
19	17 27 4.42	17 27 14.49	0.41	0.58	22 12 27.6	22 12 45.9	0.8	7.5	0.9
21	17 27 24.95	17 27 35.81	0.44	0.58	22 13 4.4	22 13 23.2	0.8	7.5	0.9
23	17 27 47.06	17 27 58.70	0.48	0.57	22 13 42.1	22 14 1.3	0.8	7.4	0.9
25	17 28 10.72	17 28 23.14	0.51	0.57	22 14 20.6	22 14 40.2	0.8	7.4	0.9
27	17 28 35.93	17 28 49.11	0.54	0.57	22 14 59.9	22 15 19.8	0.8	7.3	0.9
29	17 29 2.67	17 29 16.60	0.57	0.57	22 15 39.8	22 16 0.1	0.8	7.3	0.9
Oct. 1	17 29 30.90	17 29 45.56	0.60	0.57	22 16 20.4	22 16 40.9	0.9	7.3	0.9
3	17 30 0.58	17 30 15.96	0.63	0.57	22 17 1.5	22 17 22.3	0.9	7.3	0.9
5	17 30 31.69	17 30 47.77	0.66	0.57	22 17 43.1	22 18 3.9	0.9	7.2	0.9
7	17 31 4.21	17 31 20.99	0.69	0.56	22 18 24.9	22 18 45.9	0.9	7.2	0.9
9	17 31 38.11	17 31 55.56	0.72	0.56	22 19 7.0	22 19 28.2	0.9	7.2	0.9
11	17 32 13.36	17 32 31.48	0.75	0.56	22 19 49.3	22 20 10.5	0.9	7.2	0.9
13	17 32 49.94	17 33 8.72	0.78	0.56	22 20 31.7	22 20 52.9	0.9	7.2	0.9



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Sid. Time of Semid. passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Semidiameter.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>"</i>	<i>"</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>+</i> <i>"</i>	<i>"</i>	<i>"</i>
<b>Jan.</b> 1	7 28 26.01	7 28 15.04	0.46	0.15	22 23 31.3	22 23 55.1	1.0	2.1	0.5
3	7 28 4.04	7 27 53.00	0.46	0.15	22 24 18.9	22 24 42.7	1.0	2.1	0.5
5	7 27 41.94	7 27 30.85	0.46	0.15	22 25 6.5	22 25 30.3	1.0	2.1	0.5
7	7 27 19.74	7 27 8.62	0.46	0.15	22 25 54.0	22 26 17.7	1.0	2.1	0.5
9	7 26 57.49	7 26 46.35	0.46	0.15	22 26 41.3	22 27 4.8	1.0	2.1	0.5
11	7 26 35.22	7 26 24.10	0.46	0.15	22 27 28.2	22 27 51.6	1.0	2.1	0.5
13	7 26 12.98	7 26 1.88	0.46	0.15	22 28 14.8	22 28 37.9	1.0	2.1	0.5
15	7 25 50.81	7 25 39.77	0.46	0.15	22 29 0.9	22 29 23.8	1.0	2.1	0.5
17	7 25 28.75	7 25 17.77	0.46	0.15	22 29 46.5	22 30 9.1	0.9	2.1	0.5
19	7 25 6.83	7 24 55.93	0.46	0.15	22 30 31.5	22 30 53.8	0.9	2.1	0.5
21	7 24 45.09	7 24 34.30	0.45	0.15	22 31 15.8	22 31 37.7	0.9	2.1	0.5
23	7 24 23.58	7 24 12.91	0.45	0.15	22 31 59.4	22 32 20.8	0.9	2.1	0.5
25	7 24 2.32	7 23 51.80	0.44	0.15	22 32 42.1	22 33 3.2	0.9	2.1	0.5
27	7 23 41.35	7 23 30.99	0.43	0.15	22 33 24.0	22 33 44.5	0.9	2.1	0.5
29	7 23 20.72	7 23 10.55	0.43	0.15	22 34 4.8	22 34 24.9	0.8	2.1	0.5
31	7 23 0.47	7 22 50.50	0.42	0.15	22 34 44.7	22 35 4.2	0.8	2.1	0.5
<b>Feb.</b> 2	7 22 40.64	7 22 30.89	0.41	0.15	22 35 23.4	22 35 42.4	0.8	2.1	0.5
4	7 22 21.26	7 22 11.75	0.40	0.15	22 36 1.1	22 36 19.4	0.8	2.1	0.5
6	7 22 2.36	7 21 53.10	0.39	0.15	22 36 37.5	22 36 55.2	0.7	2.1	0.5
8	7 21 43.98	7 21 34.99	0.38	0.15	22 37 12.6	22 37 29.7	0.7	2.1	0.5
10	7 21 26.15	7 21 17.45	0.37	0.15	22 37 46.4	22 38 2.8	0.7	2.1	0.5
12	7 21 8.90	7 21 0.50	0.35	0.15	22 38 18.9	22 38 34.7	0.7	2.1	0.5
14	7 20 52.26	7 20 44.17	0.34	0.15	22 38 50.1	22 39 5.1	0.6	2.1	0.5
16	7 20 36.25	7 20 28.50	0.33	0.15	22 39 19.8	22 39 34.1	0.6	2.1	0.5
18	7 20 20.91	7 20 13.49	0.31	0.15	22 39 48.1	22 40 1.7	0.6	2.1	0.5
20	7 20 6.25	7 19 59.19	0.30	0.15	22 40 14.8	22 40 27.6	0.5	2.1	0.5
22	7 19 52.31	7 19 45.61	0.28	0.15	22 40 40.0	22 40 52.0	0.5	2.1	0.5
24	7 19 39.09	7 19 32.77	0.27	0.15	22 41 3.6	22 41 14.9	0.5	2.1	0.5
26	7 19 26.64	7 19 20.70	0.25	0.15	22 41 25.7	22 41 36.2	0.4	2.1	0.5
28	7 19 14.96	7 19 9.42	0.24	0.15	22 41 46.2	22 41 55.8	0.4	2.1	0.5
<b>Mar.</b> 2	7 19 4.08	7 18 58.95	0.22	0.15	22 42 5.1	22 42 13.9	0.4	2.1	0.5
4	7 18 54.03	7 18 49.31	0.20	0.15	22 42 22.3	22 42 30.3	0.3	2.1	0.5
6	7 18 44.81	7 18 40.53	0.19	0.15	22 42 37.8	22 42 45.0	0.3	2.1	0.5
8	7 18 36.46	7 18 32.61	0.17	0.15	22 42 51.7	22 42 58.0	0.3	2.1	0.5
10	7 18 28.98	7 18 25.56	0.15	0.14	22 43 3.9	22 43 9.3	0.2	2.0	0.5
12	7 18 22.36	7 18 19.38	0.13	0.14	22 43 14.3	22 43 18.9	0.2	2.0	0.5
14	7 18 16.63	7 18 14.11	0.11	0.14	22 43 23.1	22 43 26.8	0.2	2.0	0.5
16	7 18 11.80	7 18 9.72	0.09	0.14	22 43 30.1	22 43 32.9	0.1	2.0	0.5
18	7 18 7.87	7 18 6.25	0.07	0.14	22 43 35.3	22 43 37.3	0.1	2.0	0.5
20	7 18 4.84	7 18 3.67	0.05	0.14	22 43 38.9	22 43 40.0	0.1	2.0	0.5
22	7 18 2.73	7 18 2.01	0.03	0.14	22 43 40.7	22 43 41.0	0.0	2.0	0.5
24	7 18 1.53	7 18 1.27	0.02	0.14	22 43 40.8	22 43 40.2	0.0	2.0	0.5



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in Hour of Long.	Sid. Time of Semid <sup>r</sup> passing Merid.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in Hour of Long.	Semidiameter.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>"</i>	<i>"</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>"</i>	<i>"</i>	<i>"</i>
Mar. 26	7 18 1 <sup>h</sup> 25 <sup>s</sup>	7 18 1 <sup>h</sup> 46 <sup>s</sup>	0 <sup>h</sup> 00 <sup>m</sup> +	0 <sup>h</sup> 14 <sup>m</sup>	22 43 39 <sup>h</sup> 2 <sup>m</sup>	22 43 37 <sup>h</sup> 8 <sup>m</sup>	0 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
28	7 18 1 <sup>h</sup> 89 <sup>s</sup>	7 18 2 <sup>h</sup> 56 <sup>s</sup>	0 <sup>h</sup> 02 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 43 35 <sup>h</sup> 9 <sup>m</sup>	22 43 33 <sup>h</sup> 5 <sup>m</sup>	0 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
30	7 18 3 <sup>h</sup> 47 <sup>s</sup>	7 18 4 <sup>h</sup> 60 <sup>s</sup>	0 <sup>h</sup> 04 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 43 30 <sup>h</sup> 7 <sup>m</sup>	22 43 27 <sup>h</sup> 5 <sup>m</sup>	0 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
Apr. 1	7 18 5 <sup>h</sup> 97 <sup>s</sup>	7 18 7 <sup>h</sup> 56 <sup>s</sup>	0 <sup>h</sup> 06 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 43 23 <sup>h</sup> 9 <sup>m</sup>	22 43 19 <sup>h</sup> 8 <sup>m</sup>	0 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
3	7 18 9 <sup>h</sup> 39 <sup>s</sup>	7 18 11 <sup>h</sup> 45 <sup>s</sup>	0 <sup>h</sup> 08 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 43 15 <sup>h</sup> 4 <sup>m</sup>	22 43 10 <sup>h</sup> 5 <sup>m</sup>	0 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
5	7 18 13 <sup>h</sup> 74 <sup>s</sup>	7 18 16 <sup>h</sup> 26 <sup>s</sup>	0 <sup>h</sup> 10 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 43 5 <sup>h</sup> 1 <sup>m</sup>	22 42 59 <sup>h</sup> 4 <sup>m</sup>	0 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
7	7 18 19 <sup>h</sup> 01 <sup>s</sup>	7 18 21 <sup>h</sup> 98 <sup>s</sup>	0 <sup>h</sup> 12 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 42 53 <sup>h</sup> 2 <sup>m</sup>	22 42 46 <sup>h</sup> 6 <sup>m</sup>	0 <sup>h</sup> 3 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
9	7 18 25 <sup>h</sup> 18 <sup>s</sup>	7 18 28 <sup>h</sup> 61 <sup>s</sup>	0 <sup>h</sup> 14 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 42 39 <sup>h</sup> 5 <sup>m</sup>	22 42 32 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 3 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
11	7 18 32 <sup>h</sup> 27 <sup>s</sup>	7 18 36 <sup>h</sup> 14 <sup>s</sup>	0 <sup>h</sup> 16 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 42 24 <sup>h</sup> 2 <sup>m</sup>	22 42 15 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 3 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
13	7 18 40 <sup>h</sup> 23 <sup>s</sup>	7 18 44 <sup>h</sup> 55 <sup>s</sup>	0 <sup>h</sup> 18 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 42 7 <sup>h</sup> 1 <sup>m</sup>	22 41 58 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 4 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
15	7 18 49 <sup>h</sup> 08 <sup>s</sup>	7 18 53 <sup>h</sup> 83 <sup>s</sup>	0 <sup>h</sup> 19 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 41 48 <sup>h</sup> 4 <sup>m</sup>	22 41 38 <sup>h</sup> 4 <sup>m</sup>	0 <sup>h</sup> 4 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
17	7 18 58 <sup>h</sup> 80 <sup>s</sup>	7 19 3 <sup>h</sup> 98 <sup>s</sup>	0 <sup>h</sup> 21 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 41 28 <sup>h</sup> 0 <sup>m</sup>	22 41 17 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 4 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
19	7 19 9 <sup>h</sup> 38 <sup>s</sup>	7 19 15 <sup>h</sup> 00 <sup>s</sup>	0 <sup>h</sup> 23 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 41 5 <sup>h</sup> 9 <sup>m</sup>	22 40 54 <sup>h</sup> 3 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
21	7 19 20 <sup>h</sup> 83 <sup>s</sup>	7 19 26 <sup>h</sup> 87 <sup>s</sup>	0 <sup>h</sup> 25 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 40 42 <sup>h</sup> 3 <sup>m</sup>	22 40 29 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
23	7 19 33 <sup>h</sup> 11 <sup>s</sup>	7 19 39 <sup>h</sup> 57 <sup>s</sup>	0 <sup>h</sup> 27 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 40 17 <sup>h</sup> 1 <sup>m</sup>	22 40 3 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
25	7 19 46 <sup>h</sup> 24 <sup>s</sup>	7 19 53 <sup>h</sup> 11 <sup>s</sup>	0 <sup>h</sup> 28 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 39 50 <sup>h</sup> 3 <sup>m</sup>	22 39 36 <sup>h</sup> 2 <sup>m</sup>	0 <sup>h</sup> 6 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
27	7 20 0 <sup>h</sup> 19 <sup>s</sup>	7 20 7 <sup>h</sup> 47 <sup>s</sup>	0 <sup>h</sup> 30 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 39 21 <sup>h</sup> 7 <sup>m</sup>	22 39 6 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 6 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
29	7 20 14 <sup>h</sup> 94 <sup>s</sup>	7 20 22 <sup>h</sup> 62 <sup>s</sup>	0 <sup>h</sup> 32 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 38 51 <sup>h</sup> 6 <sup>m</sup>	22 38 36 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 6 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
May 1	7 20 30 <sup>h</sup> 49 <sup>s</sup>	7 20 38 <sup>h</sup> 56 <sup>s</sup>	0 <sup>h</sup> 33 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 38 20 <sup>h</sup> 0 <sup>m</sup>	22 38 3 <sup>h</sup> 6 <sup>m</sup>	0 <sup>h</sup> 7 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
3	7 20 46 <sup>h</sup> 83 <sup>s</sup>	7 20 55 <sup>h</sup> 28 <sup>s</sup>	0 <sup>h</sup> 35 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 37 46 <sup>h</sup> 8 <sup>m</sup>	22 37 29 <sup>h</sup> 7 <sup>m</sup>	0 <sup>h</sup> 7 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
5	7 21 3 <sup>h</sup> 92 <sup>s</sup>	7 21 12 <sup>h</sup> 75 <sup>s</sup>	0 <sup>h</sup> 36 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 37 12 <sup>h</sup> 2 <sup>m</sup>	22 36 54 <sup>h</sup> 3 <sup>m</sup>	0 <sup>h</sup> 7 <sup>m</sup>	2 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
7	7 21 21 <sup>h</sup> 77 <sup>s</sup>	7 21 30 <sup>h</sup> 97 <sup>s</sup>	0 <sup>h</sup> 38 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 36 36 <sup>h</sup> 0 <sup>m</sup>	22 36 17 <sup>h</sup> 3 <sup>m</sup>	0 <sup>h</sup> 8 <sup>m</sup>	1 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
9	7 21 40 <sup>h</sup> 34 <sup>s</sup>	7 21 49 <sup>h</sup> 89 <sup>s</sup>	0 <sup>h</sup> 39 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 35 58 <sup>h</sup> 3 <sup>m</sup>	22 35 38 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 8 <sup>m</sup>	1 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
11	7 21 59 <sup>h</sup> 62 <sup>s</sup>	7 22 9 <sup>h</sup> 52 <sup>s</sup>	0 <sup>h</sup> 41 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 35 19 <sup>h</sup> 1 <sup>m</sup>	22 34 59 <sup>h</sup> 0 <sup>m</sup>	0 <sup>h</sup> 8 <sup>m</sup>	1 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
13	7 22 19 <sup>h</sup> 59 <sup>s</sup>		0 <sup>h</sup> 42 <sup>m</sup>	0 <sup>h</sup> 14 <sup>m</sup>	22 34 38 <sup>h</sup> 5 <sup>m</sup>		0 <sup>h</sup> 9 <sup>m</sup>	1 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
			—				+		
Dec. 4	7 53 7 <sup>h</sup> 10 <sup>s</sup>	7 53 0 <sup>h</sup> 00 <sup>s</sup>	0 <sup>h</sup> 29 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 26 55 <sup>h</sup> 2 <sup>m</sup>	21 27 15 <sup>h</sup> 9 <sup>m</sup>	0 <sup>h</sup> 9 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
6	7 52 52 <sup>h</sup> 73 <sup>s</sup>	7 52 45 <sup>h</sup> 29 <sup>s</sup>	0 <sup>h</sup> 31 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 27 37 <sup>h</sup> 1 <sup>m</sup>	21 27 58 <sup>h</sup> 7 <sup>m</sup>	0 <sup>h</sup> 9 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
8	7 52 37 <sup>h</sup> 68 <sup>s</sup>	7 52 29 <sup>h</sup> 90 <sup>s</sup>	0 <sup>h</sup> 32 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 28 20 <sup>h</sup> 7 <sup>m</sup>	21 28 43 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 9 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
10	7 52 21 <sup>h</sup> 96 <sup>s</sup>	7 52 13 <sup>h</sup> 86 <sup>s</sup>	0 <sup>h</sup> 33 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 29 5 <sup>h</sup> 9 <sup>m</sup>	21 29 29 <sup>h</sup> 0 <sup>m</sup>	1 <sup>h</sup> 0 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
12	7 52 5 <sup>h</sup> 61 <sup>s</sup>	7 51 57 <sup>h</sup> 20 <sup>s</sup>	0 <sup>h</sup> 35 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 29 52 <sup>h</sup> 5 <sup>m</sup>	21 30 16 <sup>h</sup> 4 <sup>m</sup>	1 <sup>h</sup> 0 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
14	7 51 48 <sup>h</sup> 64 <sup>s</sup>	7 51 39 <sup>h</sup> 94 <sup>s</sup>	0 <sup>h</sup> 36 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 30 40 <sup>h</sup> 6 <sup>m</sup>	21 31 5 <sup>h</sup> 2 <sup>m</sup>	1 <sup>h</sup> 0 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
16	7 51 31 <sup>h</sup> 09 <sup>s</sup>	7 51 22 <sup>h</sup> 10 <sup>s</sup>	0 <sup>h</sup> 37 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 31 30 <sup>h</sup> 1 <sup>m</sup>	21 31 55 <sup>h</sup> 3 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
18	7 51 12 <sup>h</sup> 98 <sup>s</sup>	7 51 3 <sup>h</sup> 73 <sup>s</sup>	0 <sup>h</sup> 38 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 32 20 <sup>h</sup> 8 <sup>m</sup>	21 32 46 <sup>h</sup> 5 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
20	7 50 54 <sup>h</sup> 35 <sup>s</sup>	7 50 44 <sup>h</sup> 84 <sup>s</sup>	0 <sup>h</sup> 39 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 33 12 <sup>h</sup> 5 <sup>m</sup>	21 33 38 <sup>h</sup> 8 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
22	7 50 35 <sup>h</sup> 22 <sup>s</sup>	7 50 25 <sup>h</sup> 49 <sup>s</sup>	0 <sup>h</sup> 40 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 34 5 <sup>h</sup> 4 <sup>m</sup>	21 34 32 <sup>h</sup> 1 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
24	7 50 15 <sup>h</sup> 65 <sup>s</sup>	7 50 5 <sup>h</sup> 70 <sup>s</sup>	0 <sup>h</sup> 41 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 34 59 <sup>h</sup> 1 <sup>m</sup>	21 35 26 <sup>h</sup> 3 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
26	7 49 55 <sup>h</sup> 65 <sup>s</sup>	7 49 45 <sup>h</sup> 51 <sup>s</sup>	0 <sup>h</sup> 42 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 35 53 <sup>h</sup> 6 <sup>m</sup>	21 36 21 <sup>h</sup> 2 <sup>m</sup>	1 <sup>h</sup> 1 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
28	7 49 35 <sup>h</sup> 28 <sup>s</sup>	7 49 24 <sup>h</sup> 96 <sup>s</sup>	0 <sup>h</sup> 43 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 36 48 <sup>h</sup> 9 <sup>m</sup>	21 37 16 <sup>h</sup> 8 <sup>m</sup>	1 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
30	7 49 14 <sup>h</sup> 57 <sup>s</sup>	7 49 4 <sup>h</sup> 10 <sup>s</sup>	0 <sup>h</sup> 43 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 37 44 <sup>h</sup> 8 <sup>m</sup>	21 38 12 <sup>h</sup> 9 <sup>m</sup>	1 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>
32	7 48 53 <sup>h</sup> 56 <sup>s</sup>		0 <sup>h</sup> 44 <sup>m</sup>	0 <sup>h</sup> 15 <sup>m</sup>	21 38 41 <sup>h</sup> 1 <sup>m</sup>		1 <sup>h</sup> 2 <sup>m</sup>	2 <sup>h</sup> 1 <sup>m</sup>	0 <sup>h</sup> 5 <sup>m</sup>



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<i>h m s.</i>	<i>h m s.</i>	<i>s</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>+</i> <i>"</i>	<i>"</i>
Jan. 1	4 26.68	4 27.26	0.02	5 3 58.6	5 4 5.7	0.3	0.3
3	4 27.99	4 28.84	0.03	5 4 13.7	5 4 22.5	0.4	0.3
5	4 29.83	4 30.94	0.04	5 4 32.2	5 4 42.6	0.4	0.3
7	4 32.19	4 33.56	0.05	5 4 53.8	5 5 5.8	0.5	0.3
9	4 35.07	4 36.71	0.07	5 5 18.6	5 5 32.2	0.5	0.3
11	4 38.47	4 40.35	0.08	5 5 46.5	5 6 1.7	0.6	0.3
13	4 42.36	4 44.50	0.09	5 6 17.6	5 6 34.3	0.7	0.3
15	4 46.77	4 49.16	0.10	5 6 51.7	5 7 9.9	0.7	0.3
17	4 51.67	4 54.30	0.11	5 7 28.8	5 7 48.5	0.8	0.3
19	4 57.06	4 59.94	0.12	5 8 8.9	5 8 30.1	0.9	0.3
21	5 2.95	5 6.08	0.13	5 8 52.0	5 9 14.7	0.9	0.3
23	5 9.33	5 12.70	0.14	5 9 38.1	5 10 2.1	1.0	0.3
25	5 16.19	5 19.80	0.15	5 10 26.9	5 10 52.4	1.0	0.3
27	5 23.53	5 27.37	0.16	5 11 18.7	5 11 45.6	1.1	0.3
29	5 31.33	5 35.40	0.17	5 12 13.2	5 12 41.5	1.2	0.3
31	5 39.59	5 43.89	0.18	5 13 10.5	5 13 40.1	1.2	0.3
Feb. 2	5 48.31	5 52.84	0.19	5 14 10.3	5 14 41.2	1.3	0.3
4	5 57.47	6 2.22	0.20	5 15 12.8	5 15 45.0	1.3	0.3
6	6 7.07		0.21	5 16 17.9		1.4	0.3
			—			—	
Aug. 25	22 22.55	22 18.99	0.14	6 50 3.1	6 49 38.7	1.0	0.3
27	22 15.34	22 11.59	0.15	6 49 13.7	6 48 48.2	1.1	0.3
29	22 7.74	22 3.80	0.16	6 48 22.2	6 47 55.6	1.1	0.3
31	21 59.76	21 55.63	0.17	6 47 28.6	6 47 1.0	1.1	0.3
Sept. 2	21 51.40	21 47.09	0.18	6 46 33.0	6 46 4.4	1.2	0.3
4	21 42.69	21 38.21	0.19	6 45 35.4	6 45 5.9	1.2	0.3
6	21 33.64	21 28.99	0.19	6 44 36.0	6 44 5.6	1.3	0.3
8	21 24.27	21 19.46	0.20	6 43 34.8	6 43 3.6	1.3	0.3
10	21 14.58	21 9.63	0.20	6 42 32.0	6 42 0.0	1.3	0.3
12	21 4.60	21 0.50	0.21	6 41 27.6	6 40 54.8	1.4	0.3
14	20 54.34	20 49.11	0.22	6 40 21.6	6 39 48.1	1.4	0.3
16	20 43.81	20 38.44	0.22	6 39 14.2	6 38 40.0	1.4	0.3
18	20 33.02	20 27.53	0.23	6 38 5.5	6 37 30.7	1.4	0.3
20	20 21.98	20 16.38	0.23	6 36 55.6	6 36 20.2	1.5	0.3
22	20 10.73	20 5.02	0.24	6 35 44.5	6 35 8.6	1.5	0.3
24	19 59.26	19 53.46	0.24	6 34 32.4	6 33 56.1	1.5	0.3
26	19 47.62	19 41.73	0.24	6 33 19.6	6 32 42.8	1.5	0.3
28	19 35.80	19 29.83	0.25	6 32 5.8	6 31 28.7	1.5	0.3
30	19 23.83	19 17.80	0.25	6 30 51.5	6 30 14.1	1.6	0.3
Oct. 2	19 11.74	19 5.65	0.25	6 29 36.6	6 28 59.0	1.6	0.3
4	18 59.53	18 53.39	0.26	6 28 21.3	6 27 43.5	1.6	0.3
6	18 47.23	18 41.05	0.26	6 27 5.7	6 26 27.8	1.6	0.3
8	18 34.86	18 28.66	0.26	6 25 49.9	6 25 12.0	1.6	0.3



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	North. ° ' "	North. ° ' "	— "	"
Oct. 10	1 18 22.44	1 18 16.21	0.26	6 24 34.0	6 23 56.0	1.6	0.3
12	1 18 9.98	1 18 3.74	0.26	6 23 18.1	6 22 40.2	1.6	0.3
14	1 17 57.50	1 17 51.26	0.26	6 22 2.3	6 21 24.5	1.6	0.3
16	1 17 45.03	1 17 38.80	0.26	6 20 46.8	6 20 9.2	1.6	0.3
18	1 17 32.57	1 17 26.35	0.26	6 19 31.7	6 18 54.3	1.6	0.3
20	1 17 20.16	1 17 13.98	0.26	6 18 17.1	6 17 40.0	1.5	0.3
22	1 17 7.81	1 17 1.67	0.26	6 17 3.1	6 16 26.4	1.5	0.3
24	1 16 55.55	1 16 49.46	0.25	6 15 50.0	6 15 13.8	1.5	0.3
26	1 16 43.39	1 16 37.36	0.25	6 14 37.7	6 14 1.9	1.5	0.3
28	1 16 31.35	1 16 25.38	0.25	6 13 26.3	6 12 51.1	1.5	0.3
30	1 16 19.45	1 16 13.56	0.25	6 12 16.1	6 11 41.4	1.5	0.3
Nov. 1	1 16 7.71	1 16 1.91	0.24	6 11 7.1	6 10 33.1	1.4	0.3
3	1 15 56.16	1 15 50.46	0.24	6 9 59.4	6 9 26.1	1.4	0.3
5	1 15 44.81	1 15 39.21	0.23	6 8 53.2	6 8 20.6	1.4	0.3
7	1 15 33.67	1 15 28.19	0.23	6 7 48.5	6 7 16.8	1.3	0.3
9	1 15 22.78	1 15 17.42	0.22	6 6 45.5	6 6 14.7	1.3	0.3
11	1 15 12.12	1 15 6.89	0.22	6 5 44.3	6 5 14.4	1.3	0.3
13	1 15 1.73	1 14 56.64	0.21	6 4 44.9	6 4 16.0	1.2	0.3
15	1 14 51.63	1 14 46.69	0.21	6 3 47.5	6 3 19.5	1.2	0.3
17	1 14 41.84	1 14 37.06	0.20	6 2 52.1	6 2 25.2	1.1	0.3
19	1 14 32.36	1 14 27.75	0.19	6 1 58.8	6 1 33.0	1.1	0.3
21	1 14 23.22	1 14 18.78	0.19	6 1 7.8	6 0 43.1	1.0	0.3
23	1 14 14.43	1 14 10.17	0.18	6 0 19.1	5 59 55.6	1.0	0.3
25	1 14 6.01	1 14 1.94	0.17	5 59 32.8	5 59 10.5	0.9	0.3
27	1 13 57.96	1 13 54.09	0.16	5 58 48.9	5 58 28.0	0.9	0.3
29	1 13 50.32	1 13 46.64	0.16	5 58 7.7	5 57 48.1	0.8	0.3
Dec. 1	1 13 43.07	1 13 39.60	0.15	5 57 29.1	5 57 10.9	0.8	0.3
3	1 13 36.24	1 13 32.98	0.14	5 56 53.3	5 56 36.4	0.7	0.3
5	1 13 29.84	1 13 26.81	0.13	5 56 20.1	5 56 4.6	0.7	0.3
7	1 13 23.89	1 13 21.07	0.12	5 55 49.8	5 55 35.7	0.6	0.3
9	1 13 18.37	1 13 15.79	0.11	5 55 22.3	5 55 9.7	0.5	0.3
11	1 13 13.32	1 13 10.96	0.10	5 54 57.9	5 54 46.7	0.5	0.3
13	1 13 8.73	1 13 6.62	0.09	5 54 36.3	5 54 26.7	0.4	0.3
15	1 13 4.62	1 13 2.74	0.08	5 54 17.8	5 54 9.6	0.4	0.3
17	1 13 0.98	1 12 59.35	0.07	5 54 2.2	5 53 55.7	0.3	0.3
19	1 12 57.84	1 12 56.46	0.06	5 53 49.9	5 53 44.8	0.2	0.3
21	1 12 55.21	1 12 54.08	0.05	5 53 40.6	5 53 37.2	0.2	0.3
23	1 12 53.08	1 12 52.20	0.04	5 53 34.6	5 53 32.7	0.1	0.3
25	1 12 51.45	1 12 50.82	0.03	5 53 31.6	5 53 31.2	0.0	0.3
27	1 12 50.32	1 12 49.95	0.02	5 53 31.7	5 53 32.9	0.0	0.3
29	1 12 49.70	1 12 49.60	0.01	5 53 35.0	5 53 37.9	0.1	0.3
31	1 12 49.62	1 12 49.76	0.00	5 53 41.6	5 53 46.0	0.2	0.3



## MEAN PLACES FOR JANUARY 0 + .048. (See page 329.)

Star's Name.	Mag.	Right Ascension.	Annual Var.	Declination.	Annual Var.
$\alpha$ Andromedæ - - -	2	<sup>h</sup> 0 <sup>m</sup> 140 <sup>s</sup> 238	+ 3' 0864	N. 28° 22' 21".62	+ 19".899
$\gamma$ Pegasi ( <i>Algenib</i> )	3.2	0 6 32.548	3' 0811	N. 14 27 38.40	20.027
$\beta$ Hydri - - -	3	0 18 52.927	3' 2796	S. 77 59 14.40	20.247
12 Ceti - - -	6	0 23 24.268	3' 0593	S. 4 40 33.49	19.940
$\alpha$ Cassiopeæ - - -	var.	0 33 8.693	+ 3' 3624	N. 55 49 26.31	+ 19.805
$\beta$ Ceti - - -	2	0 37 3.652	3' 0121	S. 18 42 2.92	19.813
$\epsilon$ Piscium - - -	4	0 56 11.911	3' 1110	N. 7 11 22.47	19.455
$\alpha$ Urs. Min. ( <i>Polaris</i> )	2	1 11 16.990	20.1966	N. 88 36 58.74	19.091
$\theta$ Ceti - - -	3	1 17 31.466	+ 2' 9963	S. 8 51 18.24	+ 18.696
$\eta$ Piscium - - -	4.3	1 24 31.703	3' 1983	N. 14 40 29.22	18.702
$\alpha$ Eridani ( <i>Achernar</i> )	1	1 32 52.026	2' 2349	S. 57 53 51.51	18.419
$\nu$ Piscium - - -	5.4	1 34 40.001	3' 1139	N. 4 49 43.47	18.324
$\beta$ Arietis - - -	3.2	1 47 27.659	+ 3' 2962	N. 20 10 17.22	+ 17.778
$\alpha$ Arietis - - -	2	1 59 50.914	3' 3665	N. 22 50 46.85	17.224
67 Ceti - - -	6	2 10 29.923	2' 9864	S. 7 1 21.46	16.756
$\zeta$ Ceti - - -	4	2 21 14.925	3' 1802	N. 7 52 32.70	16.346
$\gamma$ Ceti - - -	3.4	2 36 33.910	+ 3' 1012	N. 2 41 9.90	+ 15.371
$\alpha$ Ceti - - -	2.3	2 55 29.039	3' 1273	N. 3 34 40.00	14.344
$\delta$ Arietis - - -	4.5	3 4 11.898	3' 4183	N. 19 13 59.67	13.920
$\alpha$ Persei - - -	2	3 15 3.176	4' 2481	N. 49 23 44.88	13.169
$\eta$ Tauri - - -	3	3 39 45.543	+ 3' 5524	N. 23 42 3.25	+ 11.457
$\gamma$ Eridani - - -	3	3 51 57.795	2' 7945	S. 13 52 48.88	10.511
$\delta$ Eridani - - -	4.5	4 5 31.200	2' 9214	S. 7 10 41.99	9.681
$\epsilon$ Tauri - - -	4.3	4 21 1.620	3' 4924	N. 18 53 22.76	8.359
$\alpha$ Tauri ( <i>Aldebaran</i> )	1	4 28 27.782	+ 3' 4353	N. 16 14 44.14	+ 7.622
$\iota$ Aurigæ - - -	3	4 48 31.811	3' 8947	N. 32 57 26.84	6.133
$\epsilon$ Leporis - - -	4.3	4 59 57.410	2' 5359	S. 22 32 51.41	5.123
$\alpha$ Aurigæ ( <i>Capella</i> )	1	5 7 5.338	4' 4217	N. 45 51 44.60	4.154
$\beta$ Orionis ( <i>Rigel</i> )	1	5 8 17.411	+ 2' 8799	S. 8 21 15.13	+ 4.464
$\beta$ Tauri - - -	2	5 18 4.487	3' 7873	N. 28 29 40.42	3.446
$\delta$ Orionis - - -	2	5 25 21.975	3' 0641	S. 0 23 52.63	2.980
$\alpha$ Leporis - - -	3	5 26 59.856	2' 6461	S. 17 55 2.36	2.880
$\epsilon$ Orionis - - -	2	5 29 37.015	+ 3' 0415	S. 1 17 14.63	+ 2.635
$\alpha$ Columbæ - - -	2	5 34 56.721	2' 1778	S. 34 8 40.13	2.187
$\alpha$ Orionis - - -	var.	5 48 8.026	3' 2462	N. 7 22 48.64	+ 1.035
$\nu$ Orionis - - -	5.4	6 0 8.986	3' 4260	N. 14 46 53.02	- 0.035
$\mu$ Geminorum - - -	3	6 15 5.742	+ 3' 6322	N. 22 34 38.75	- 1.449
$\alpha$ Argus ( <i>Canopus</i> )	1	6 21 4.083	1' 3303	S. 52 37 32.06	1.842
$\gamma$ Geminorum - - -	2.3	6 30 12.101	3' 4662	N. 16 30 28.30	2.542
51 (Hév.) Cephei - - -	5	6 38 40.817	+ 30.2518	N. 87 14 21.25	- 3.467



MEAN PLACES FOR JANUARY 0 + <sup>d</sup>048. (See page 329.)

Star's Name.	Mag.	Right Ascension.	Annual Var.	Declination.	Annual Var.
$\alpha$ Canis Maj. ( <i>Sirius</i> )	1	<sup>h</sup> 6 <sup>m</sup> 39 <sup>s</sup> 25.283	+ 2.6452	S. 16 32 24.53	- 4.657
$\epsilon$ Canis Majoris -	2.1	6 53 31.027	2.3579	S. 28 47 50.09	4.653
$\gamma$ Canis Majoris -	4.5	6 57 52.659	2.7158	S. 15 26 34.95	4.995
$\delta$ Geminorum -	3.4	7 12 21.477	3.5913	N. 22 13 8.65	6.246
$\alpha^1$ Geminor. ( <i>Castor</i> )	2.1	7 26 18.152	+ 3.8417	N. 32 10 14.97	- 7.451
$\alpha$ Can. Min. ( <i>Procyon</i> )	1	7 32 29.688	3.1446	N. 5 33 22.44	8.908
$\beta$ Geminor. ( <i>Pollux</i> )	1.2	7 37 21.465	3.6812	N. 28 20 15.56	8.324
6 Cancrī - - -	5	7 55 31.896	3.6942	N. 28 9 23.33	9.754
15 Argūs - - -	3	8 2 0.479	+ 2.5548	S. 23 55 51.98	- 10.113
$\eta$ Cancrī - - -	6	8 25 11.244	3.4788	N. 20 52 50.46	11.929
$\epsilon$ Hydræ - - -	3.4	8 39 53.432	3.1837	N. 6 53 38.67	12.923
$\epsilon$ Ursæ Majoris -	3	8 50 17.628	4.1404	N. 48 32 59.60	13.843
83 Cancrī - - -	6	9 11 43.237	+ 3.3557	N. 18 15 17.09	- 15.051
$\epsilon$ Argūs - - -	2	9 13 36.547	1.6016	S. 58 43 47.03	14.927
$\alpha$ Hydræ - - -	2	9 21 11.889	2.9485	S. 8 5 47.54	15.397
$\theta$ Ursæ Majoris -	3	9 24 8.822	4.0520	N. 52 16 4.86	16.154
$\epsilon$ Leonis - - -	3	9 38 28.080	+ 3.4188	N. 24 22 17.14	- 16.371
$\pi$ Leonis - - -	5	9 53 20.516	3.1764	N. 8 40 0.06	17.100
$\alpha$ Leonis ( <i>Regulus</i> )	1.2	10 1 26.776	3.2023	N. 12 36 5.31	17.423
$\gamma^1$ Leonis - - -	2	10 12 48.122	3.3163	N. 20 29 52.95	18.048
$\rho$ Leonis - - -	4	10 25 57.889	+ 3.1660	N. 9 58 28.63	- 18.420
$\eta$ Argūs - - -	2	10 40 1.360	2.3093	S. 59 0 2.74	18.755
$\iota$ Leonis - - -	5	10 42 25.293	3.1575	N. 11 13 56.95	18.933
$\alpha$ Ursæ Majoris -	2	10 55 41.171	3.7653	N. 62 27 7.09	19.360
$\chi$ Leonis - - -	5	10 58 18.599	+ 3.0981	N. 8 2 16.99	- 19.408
$\delta$ Leonis - - -	2.3	11 7 11.513	3.2024	N. 21 14 7.47	19.670
$\delta$ Hydræ et Crateris	3.4	11 12 50.503	2.9950	S. 14 4 32.13	19.454
$\nu$ Leonis - - -	5.4	11 30 17.559	3.0691	S. 0 6 22.14	19.859
$\beta$ Leonis - - -	2	11 42 25.582	+ 3.0648	N. 15 17 55.39	- 20.099
$\gamma$ Ursæ Majoris -	2.3	11 46 58.914	3.1887	N. 54 25 2.81	20.027
$\epsilon$ Corvi - - -	3	12 3 26.500	3.0756	S. 21 53 47.65	20.045
$\beta$ Chamæleontis -	5	12 10 45.941	3.3395	S. 78 35 25.97	20.041
$\eta$ Virginis - - -	3.4	12 13 15.244	+ 3.0650	N. 0 3 21.65	- 20.054
$\alpha^1$ Crucis - - -	1	12 19 22.701	3.2650	S. 62 22 38.17	19.932
$\beta$ Corvi - - -	2.3	12 27 33.508	3.1318	S. 22 40 39.79	19.976
$\gamma^1$ Virginis - - -	3.2	12 35 4.415	3.0375	S. 0 44 11.82	19.866
12 Canum Venaticor. -	3	12 49 56.487	+ 2.8161	N. 39 1 15.60	- 19.523
$\theta$ Virginis - - -	4.5	13 3 13.187	3.0989	S. 4 50 39.58	19.335
$\alpha$ Virginis ( <i>Spica</i> )	1	13 18 20.737	3.1506	S. 10 28 55.45	18.932
$\zeta$ Virginis - - -	3.4	13 28 4.232	+ 3.0523	N. 0 4 11.64	- 18.527



MEAN PLACES FOR JANUARY 0 + .048. (See page 329.)

Star's Name.	Mag.	Right Ascension.	Annual Var.	Declination.	Annual Var.
		h m s	s	° ' "	"
γ Ursæ Majoris - -	2	13 42 24.930	+ 2.3728	N.49 57 46.24	-18.109
γ Bootis - - -	3	13 48 29.672	2.8581	N.19 3 1.13	18.203
β Centauri - - -	1	13 54 40.257	4.1618	S.59 44 39.60	17.664
τ Virginis - - -	4	13 55 1.845	3.0476	N. 2 10 28.49	17.648
α Bootis ( <i>Arcturus</i> )	1	14 9 43.897	+ 2.7338	N.19 51 37.41	-18.903
ρ Bootis - - -	4.3	14 26 13.649	2.5868	N.30 56 36.05	15.971
α Centauri - - -	1	14 30 48.325	4.0367	S.60 17 39.13	15.022
σ Bootis - - -	2.3	14 39 18.503	2.6194	N.27 37 24.36	15.395
α Libræ - - -	2.3	14 43 41.335	+ 3.3058	S.15 29 59.61	-15.211
β Ursæ Minoris - -	2	14 51 6.857	- 0.2489	N.74 41 11.24	14.757
ψ Bootis - - -	4.5	14 58 52.577	+ 2.5705	N.27 27 21.72	14.246
β Libræ - - -	2	15 10 0.758	3.2188	S. 8 54 5.16	13.562
α Coronæ Borealis -	2	15 29 10.990	+ 2.5377	N.27 9 13.63	-12.335
ζ Serpentis - - -	2.3	15 37 51.859	+ 2.9492	N. 6 50 11.26	11.598
ζ Ursæ Minoris - -	4.5	15 48 45.572	- 2.2885	N.78 11 35.53	10.863
β Scorpii - - -	2	15 57 52.802	+ 3.4776	S.19 26 50.27	10.206
δ Ophiuchi - - -	3	16 7 31.986	+ 3.1363	S. 3 21 27.05	- 9.572
α Scorpii ( <i>Antares</i> )	1.2	16 21 26.333	3.6668	S.26 8 27.62	8.387
γ Draconis - - -	3.2	16 22 14.848	0.8236	N.61 48 32.94	8.217
α Trianguli Australis	2	16 34 55.556	6.2820	S.68 47 4.08	7.351
ζ Herculis - - -	3.2	16 36 23.161	+ 2.2624	N.31 50 24.10	- 6.709
κ Ophiuchi - - -	3.4	16 51 30.938	+ 2.8340	N. 9 34 45.09	5.880
σ Ursæ Minoris - -	4.5	16 59 23.255	- 6.3894	N.82 14 48.95	5.249
α Herculis - - -	var.	17 8 43.136	+ 2.7322	N.14 32 26.06	4.404
θ Ophiuchi - - -	3.4	17 14 1.557	+ 3.6765	S.24 51 59.35	- 3.977
β Draconis - - -	3.2	17 27 29.608	1.3509	N.52 23 54.66	2.831
α Ophiuchi - - -	2	17 28 53.949	2.7808	N.12 39 24.42	2.921
μ Herculis - - -	3.4	17 41 22.219	2.3425	N.27 47 53.97	2.362
γ Draconis - - -	2.3	17 53 35.277	+ 1.3924	N.51 30 18.10	- 0.600
μ Sagittarii - - -	4	18 5 59.227	3.5844	S.21 5 24.75	+ 0.519
σ Octantis - - -	6	18 6 24.317	+109.9318	S.89 16 42.06	0.742
δ Ursæ Minoris - -	4.5	18 14 16.673	-19.3995	N.86 36 21.06	1.260
α Lyræ ( <i>Vega</i> ) -	1	18 32 32.155	+ 2.0304	N.38 39 51.25	+ 3.126
β Lyræ - - -	var.	18 45 16.713	2.2121	N.33 12 47.11	3.912
ζ Aquilæ - - -	3	18 59 25.910	2.7521	N.13 40 20.49	5.070
ω Aquilæ - - -	6.5	19 11 42.793	2.8140	N.11 21 46.15	6.193
δ Aquilæ - - -	3.4	19 18 56.518	+ 3.0239	N. 2 51 27.97	+ 6.875
κ Sagittarii - - -	5.4	19 28 47.466	3.6557	S.25 10 2.86	7.601
γ Aquilæ - - -	3	19 40 4.657	2.8514	N.10 17 54.22	8.487
α Aquilæ ( <i>Altair</i> )	1.2	19 44 26.344	+ 2.9272	N. 8 31 37.06	+ 9.210



MEAN PLACES FOR JANUARY 0 + <sup>d</sup>048. (See page 329.)

Star's Name.	Mag.	Right Ascension.	Annual Var.	Declination.	Annual Var.
$\beta$ Aquilæ - - -	4	<sup>h</sup> 19 <sup>m</sup> 48 <sup>s</sup> 55.549	+ 2.9464	N. 6° 5' 2.26	+ 8.702
$\lambda$ Ursæ Minoris -	5	19 54 17.818	- 59.3114	N. 88 55 4.35	9.562
$\alpha^*$ Capricorni - -	3.4	20 10 50.295	+ 3.3324	S. 12 56 45.08	10.840
$\alpha$ Pavonis - - -	2	20 15 21.187	4.7954	S. 57 8 53.60	11.140
$\rho$ Capricorni - - -	5	20 21 26.383	+ 3.4256	S. 18 14 28.41	+ 11.602
$\alpha$ Cygni - - -	2.1	20 36 59.960	2.0430	N. 44 49 0.98	12.690
32 Vulpeculæ - - -	5.6	20 49 1.153	2.5538	N. 27 33 52.35	13.490
61 Cygni - - -	5.6	21 1 3.949	2.6737	N. 38 6 41.36	17.495
$\zeta$ Cygni - - -	3	21 7 24.154	+ 2.5482	N. 29 41 41.20	+ 14.562
$\alpha$ Cephei - - -	3.2	21 15 28.515	1.4375	N. 62 2 6.39	15.113
$\beta$ Aquarii - - -	3	21 24 42.743	3.1624	S. 6 8 29.87	15.633
$\beta$ Cephei - - -	3	21 26 58.385	0.7996	N. 69 59 24.25	15.708
$\epsilon$ Pegasi - - -	2.3	21 37 48.047	+ 2.9480	N. 9 16 48.68	+ 16.319
16 Pegasi - - -	5.6	21 47 8.871	2.7262	N. 25 18 51.60	16.772
$\alpha$ Aquarii - - -	3	21 59 6.275	3.0823	S. 0 57 1.81	17.317
$\alpha$ Gruis - - -	2	22 0 1.745	3.8144	S. 47 35 19.99	17.190
$\theta$ Aquarii - - -	4.5	22 9 58.293	+ 3.1692	S. 8 25 46.39	+ 17.756
$\eta$ Aquarii - - -	4.3	22 28 40.463	3.0820	S. 0 47 12.18	18.429
$\zeta$ Pegasi - - -	3.4	22 34 58.596	2.9872	N. 10 9 12.85	18.693
$\alpha$ Pis. Aus. (Fomalhaut)	1.2	22 50 27.642	3.3288	S. 30 18 38.37	18.966
$\alpha$ Pegasi (Markab)	2	22 58 17.136	+ 2.9831	N. 14 30 23.04	+ 19.312
$\gamma$ Piscium - - -	4	23 10 25.524	3.1062	N. 2 34 20.37	19.573
$\kappa$ Piscium - - -	5.4	23 20 16.084	3.0745	N. 0 32 39.22	19.635
$\iota$ Piscium - - -	4.5	23 33 15.864	3.0844	N. 4 55 18.49	19.468
$\gamma$ Cephei - - -	3.4	23 34 1.860	+ 2.4018	N. 76 54 24.86	+ 20.077
$\delta$ Sculptoris - - -	4.5	23 42 9.007	3.1319	S. 28 50 55.35	19.925
$\omega$ Piscium - - -	4	23 52 38.198	+ 3.0776	N. 6 8 36.86	+ 19.916



# FORMULÆ OF REDUCTION.

ACCORDING TO THE LATE PROFESSOR BESSEL.

1.—*Adopting the Notation of the British Association Catalogue and the Coefficients of Professor Peters (Numerus Constans Nutationis, p. 75).*

$$A = -20''.4451 \cos \omega \cos \odot$$

$$B = -20''.4451 \sin \odot$$

$$C = t - 0''.02519 \sin 2\odot - 0''.34243 \sin \oslash + 0''.00410 \sin 2 \oslash - 0''.00405 \sin 2 \zeta$$

$$D = -0''.5507 \cos 2 \odot - 9''.2237 \cos \oslash + 0''.0895 \cos 2 \oslash - 0''.0885 \cos 2 \zeta$$

$$a = \cos \alpha \sec \delta$$

$$b = \sin \alpha \sec \delta$$

$$c = 46''.0822 + 20''.0547 \sin \alpha \tan \delta$$

$$d = \cos \alpha \tan \delta$$

$$a' = \tan \omega \cos \delta - \sin \alpha \sin \delta$$

$$b' = \cos \alpha \sin \delta$$

$$c' = 20''.0547 \cos \alpha$$

$$d' = -\sin \alpha$$

$\Delta c$  = the annual proper motion in Right Ascension, *in arc*.

$\Delta c'$  = the annual proper motion in Declination.

Where  $t$  denotes the time reckoned from the moment when the Sun's mean longitude was  $280^\circ$  (Jan.  $0 + .048$ ) and expressed in fractional parts of a tropical year,  $\odot$  the Sun's and  $\zeta$  the Moon's true longitude,  $\oslash$  the mean longitude of the Moon's node, and  $\omega$  the obliquity of the Ecliptic, each for the time  $t$ :  $\alpha$  the mean Right Ascension, *in arc*, and  $\delta$  the mean Declination for the beginning of the year. Then, for the time represented by  $t$ ,

$$\text{Apparent R.A., in arc,} = \alpha + Aa + Bb + Cc + Dd + t\Delta c.$$

$$\text{Apparent Dec.} \quad - \quad - \quad - \quad = \delta + Aa' + Bb' + Cc' + Dd' + t\Delta c'.$$

2.—*Using the same Notation and Coefficients, and assuming*

$$46''.0822 C = f \qquad B = h \cos H$$

$$20''.0547 C = g \cos G \qquad A = h \sin H$$

$$D = g \sin G \qquad A \tan \omega = i$$

$$\text{Apparent R.A., in arc,} = \alpha + f + t\Delta c \\ + g \sin (G + \alpha) \tan \delta + h \sin (H + \alpha) \sec \delta$$

$$\text{Apparent Dec.} \quad - \quad - \quad - \quad = \delta + i \cos \delta + t\Delta c' \\ + g \cos (G + \alpha) + h \cos (H + \alpha) \sin \delta$$



## CONSTANTS FOR FACILITATING THE REDUCTION OF STARS.

Month and Day.	At Greenwich Mean Midnight.					
	<i>f</i>	<i>g</i>	<i>G</i>	<i>h</i>	<i>H</i>	<i>i</i>
Jan. 1	— 13° 29	+ 7° 63	139 16	+ 20° 38	349 28	— 1° 62
6	12° 51	7° 32	138 2	20° 31	344 45	2° 32
11	11° 75	7° 01	136 50	20° 22	339 59	3° 00
16	11° 01	6° 70	135 40	20° 11	335 12	3° 66
21	— 10° 31	+ 6° 40	134 31	+ 19° 99	330 21	— 4° 29
26	9° 64	6° 10	133 25	19° 85	325 25	4° 89
31	9° 00	5° 82	132 20	19° 71	320 28	5° 44
Feb. 5	8° 40	5° 54	131 17	19° 56	315 26	5° 96
10	— 7° 83	+ 5° 28	130 14	+ 19° 41	310 18	— 6° 42
15	7° 30	5° 03	129 11	19° 27	305 8	6° 84
20	6° 80	4° 80	128 6	19° 14	299 54	7° 20
25	6° 33	4° 58	126 58	19° 02	294 35	7° 50
Mar. 2	— 5° 89	+ 4° 39	125 44	+ 18° 92	289 14	— 7° 75
7	5° 46	4° 21	124 23	18° 84	283 51	7° 94
12	5° 05	4° 05	122 53	18° 79	278 27	8° 06
17	4° 65	3° 91	121 10	18° 76	273 2	8° 13
22	— 4° 25	+ 3° 79	119 14	+ 18° 76	267 38	— 8° 13
27	3° 85	3° 68	117 2	18° 78	262 15	8° 08
April 1	3° 43	3° 60	114 32	18° 83	256 54	7° 96
6	3° 00	3° 53	111 45	18° 91	251 35	7° 78
11	— 2° 56	+ 3° 48	108 38	+ 19° 00	246 21	— 7° 55
16	2° 09	3° 45	105 15	19° 11	241 12	7° 26
21	1° 59	3° 44	101 35	19° 24	236 6	6° 93
26	1° 06	3° 45	97 39	19° 37	231 6	6° 54
May 1	— 0° 49	+ 3° 47	93 32	+ 19° 51	226 10	— 6° 11
6	+ 0° 10	3° 52	89 17	19° 65	221 20	5° 63
11	0° 73	3° 59	84 55	19° 80	216 34	5° 12
16	1° 39	3° 67	80 30	19° 93	211 53	4° 57
21	+ 2° 09	+ 3° 77	76 5	+ 20° 06	207 16	— 3° 99
26	2° 80	3° 89	71 44	20° 16	202 43	3° 38
31	3° 55	4° 03	67 28	20° 26	198 13	2° 75
June 5	4° 31	4° 18	63 18	20° 34	193 46	2° 10
10	+ 5° 09	+ 4° 34	59 17	+ 20° 40	189 21	— 1° 44
15	5° 89	4° 51	55 25	20° 43	184 57	0° 77
20	6° 69	4° 69	51 43	20° 45	180 35	— 0° 09
25	7° 49	4° 88	48 10	20° 44	176 12	+ 0° 59
30	8° 28	5° 08	44 48	20° 41	171 49	1° 26
July 5	+ 9° 07	+ 5° 28	41 36	+ 20° 35	167 25	+ 1° 92



## CONSTANTS FOR FACILITATING THE REDUCTION OF STARS.

Month and Day.	At Greenwich Mean Midnight.					
	<i>f</i>	<i>g</i>	<i>G</i>	<i>h</i>	<i>H</i>	<i>i</i>
July	5 + 9.07	+ 5.28	41 36	+ 20.35	167 25	+ 1.92
	10 9.84	5.48	38 34	20.28	162 59	2.58
	15 10.59	5.67	35 42	20.19	158 31	3.21
	20 11.32	5.87	33 0	20.09	154 1	3.82
Aug.	25 + 12.02	+ 6.07	30 28	+ 19.97	149 27	+ 4.40
	30 12.70	6.26	28 6	19.84	144 49	4.96
	4 13.34	6.45	25 54	19.70	140 7	5.48
	9 13.95	6.63	23 52	19.56	135 21	5.96
	14 + 14.53	+ 6.82	21 59	+ 19.43	130 29	+ 6.41
	19 15.08	7.00	20 17	19.29	125 33	6.81
	24 15.60	7.17	18 44	19.15	120 33	7.15
	29 16.09	7.34	17 21	19.04	115 28	7.46
Sept.	3 + 16.56	+ 7.50	16 8	+ 18.94	110 19	+ 7.71
	8 17.00	7.66	15 4	18.86	105 6	7.90
	13 17.43	7.83	14 10	18.79	99 50	8.04
	18 17.86	7.99	13 24	18.76	94 32	8.12
Oct.	23 + 18.27	+ 8.15	12 47	+ 18.76	89 12	+ 8.14
	28 18.69	8.32	12 18	18.77	83 51	8.10
	3 19.11	8.50	11 56	18.81	78 30	8.00
	8 19.54	8.68	11 41	18.88	73 11	7.84
	13 + 20.00	+ 8.88	11 31	+ 18.97	67 53	+ 7.63
	18 20.47	9.09	11 25	19.08	62 37	7.35
	23 20.97	9.31	11 22	19.20	57 24	7.02
	28 21.51	9.55	11 22	19.34	52 15	6.63
Nov.	2 + 22.07	+ 9.80	11 23	+ 19.48	47 9	+ 6.20
	7 22.67	10.06	11 23	19.63	42 7	5.71
	12 23.31	10.35	11 23	19.79	37 9	5.18
	17 23.98	10.64	11 20	19.92	32 15	4.61
Dec.	22 + 24.69	+ 10.95	11 15	+ 20.05	27 24	+ 4.00
	27 25.42	11.28	11 7	20.17	22 35	3.36
	2 26.19	11.61	10 55	20.27	17 49	2.69
	7 26.98	11.95	10 40	20.35	13 6	2.00
	12 + 27.79	+ 12.29	10 21	+ 20.40	8 25	+ 1.30
	17 28.61	12.64	9 58	20.44	3 45	+ 0.58
	22 29.43	12.99	9 32	20.45	359 4	- 0.15
	27 30.26	13.33	9 3	20.43	354 23	0.87
32	+ 31.07	+ 13.67	8 31	+ 20.39	349 42	- 1.58



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS (*Polaris*),  
FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> <sup>m</sup> I II	<sup>°</sup> <sup>'</sup> 88 37	<sup>h</sup> <sup>m</sup> I IO	<sup>°</sup> <sup>'</sup> 88 37	<sup>h</sup> <sup>m</sup> I IO	<sup>°</sup> <sup>'</sup> 88 36	<sup>h</sup> <sup>m</sup> I IO	<sup>°</sup> <sup>'</sup> 88 36	
1	31 <sup>s</sup> .66	11 <sup>s</sup> .9	63 <sup>s</sup> .65	11 <sup>s</sup> .8	42 <sup>s</sup> .91	66 <sup>s</sup> .8	32 <sup>s</sup> .29	57 <sup>s</sup> .8	1
2	30 <sup>s</sup> .76	12 <sup>s</sup> .0	62 <sup>s</sup> .79	11 <sup>s</sup> .7	42 <sup>s</sup> .33	66 <sup>s</sup> .5	32 <sup>s</sup> .21	57 <sup>s</sup> .5	2
3	29 <sup>s</sup> .86	12 <sup>s</sup> .1	61 <sup>s</sup> .94	11 <sup>s</sup> .6	41 <sup>s</sup> .77	66 <sup>s</sup> .3	32 <sup>s</sup> .15	57 <sup>s</sup> .2	3
4	28 <sup>s</sup> .95	12 <sup>s</sup> .2	61 <sup>s</sup> .09	11 <sup>s</sup> .5	41 <sup>s</sup> .22	66 <sup>s</sup> .0	32 <sup>s</sup> .11	56 <sup>s</sup> .9	4
5	28 <sup>s</sup> .05	12 <sup>s</sup> .3	60 <sup>s</sup> .25	11 <sup>s</sup> .4	40 <sup>s</sup> .69	65 <sup>s</sup> .8	32 <sup>s</sup> .08	56 <sup>s</sup> .6	5
6	27 <sup>s</sup> .14	12 <sup>s</sup> .3	59 <sup>s</sup> .41	11 <sup>s</sup> .2	40 <sup>s</sup> .17	65 <sup>s</sup> .5	32 <sup>s</sup> .07	56 <sup>s</sup> .3	6
7	26 <sup>s</sup> .23	12 <sup>s</sup> .4	58 <sup>s</sup> .59	11 <sup>s</sup> .1	39 <sup>s</sup> .67	65 <sup>s</sup> .3	32 <sup>s</sup> .08	56 <sup>s</sup> .0	7
8	25 <sup>s</sup> .32	12 <sup>s</sup> .4	57 <sup>s</sup> .77	10 <sup>s</sup> .9	39 <sup>s</sup> .19	65 <sup>s</sup> .0	{32 <sup>s</sup> .01}	{55 <sup>s</sup> .7}	8
9	24 <sup>s</sup> .41	12 <sup>s</sup> .4	56 <sup>s</sup> .96	10 <sup>s</sup> .8	38 <sup>s</sup> .72	64 <sup>s</sup> .8	32 <sup>s</sup> .21	55 <sup>s</sup> .0	9
10	23 <sup>s</sup> .50	12 <sup>s</sup> .5	56 <sup>s</sup> .15	10 <sup>s</sup> .6	38 <sup>s</sup> .26	64 <sup>s</sup> .5	32 <sup>s</sup> .29	54 <sup>s</sup> .7	10
11	22 <sup>s</sup> .59	12 <sup>s</sup> .5	55 <sup>s</sup> .35	10 <sup>s</sup> .4	37 <sup>s</sup> .81	64 <sup>s</sup> .2	32 <sup>s</sup> .38	54 <sup>s</sup> .4	11
12	21 <sup>s</sup> .68	12 <sup>s</sup> .5	54 <sup>s</sup> .57	10 <sup>s</sup> .2	37 <sup>s</sup> .38	63 <sup>s</sup> .9	32 <sup>s</sup> .49	54 <sup>s</sup> .1	12
13	20 <sup>s</sup> .76	12 <sup>s</sup> .5	53 <sup>s</sup> .80	10 <sup>s</sup> .1	36 <sup>s</sup> .97	63 <sup>s</sup> .6	32 <sup>s</sup> .62	53 <sup>s</sup> .8	13
14	19 <sup>s</sup> .85	12 <sup>s</sup> .5	53 <sup>s</sup> .04	9 <sup>s</sup> .9	36 <sup>s</sup> .58	63 <sup>s</sup> .3	32 <sup>s</sup> .76	53 <sup>s</sup> .5	14
15	18 <sup>s</sup> .93	12 <sup>s</sup> .6	52 <sup>s</sup> .28	9 <sup>s</sup> .7	36 <sup>s</sup> .20	63 <sup>s</sup> .0	32 <sup>s</sup> .92	53 <sup>s</sup> .2	15
16	18 <sup>s</sup> .01	12 <sup>s</sup> .6	51 <sup>s</sup> .54	9 <sup>s</sup> .5	35 <sup>s</sup> .84	62 <sup>s</sup> .7	33 <sup>s</sup> .09	52 <sup>s</sup> .9	16
17	17 <sup>s</sup> .09	12 <sup>s</sup> .6	50 <sup>s</sup> .81	9 <sup>s</sup> .4	35 <sup>s</sup> .49	62 <sup>s</sup> .4	33 <sup>s</sup> .28	52 <sup>s</sup> .6	17
18	16 <sup>s</sup> .18	12 <sup>s</sup> .6	50 <sup>s</sup> .08	9 <sup>s</sup> .2	35 <sup>s</sup> .16	62 <sup>s</sup> .1	33 <sup>s</sup> .49	52 <sup>s</sup> .3	18
19	15 <sup>s</sup> .27	12 <sup>s</sup> .5	49 <sup>s</sup> .36	9 <sup>s</sup> .0	34 <sup>s</sup> .85	61 <sup>s</sup> .8	33 <sup>s</sup> .71	52 <sup>s</sup> .0	19
20	14 <sup>s</sup> .36	12 <sup>s</sup> .5	48 <sup>s</sup> .66	8 <sup>s</sup> .8	34 <sup>s</sup> .55	61 <sup>s</sup> .5	33 <sup>s</sup> .95	51 <sup>s</sup> .7	20
21	13 <sup>s</sup> .45	12 <sup>s</sup> .5	47 <sup>s</sup> .97	8 <sup>s</sup> .6	34 <sup>s</sup> .27	61 <sup>s</sup> .2	34 <sup>s</sup> .21	51 <sup>s</sup> .4	21
22	12 <sup>s</sup> .54	12 <sup>s</sup> .5	47 <sup>s</sup> .29	8 <sup>s</sup> .4	34 <sup>s</sup> .01	60 <sup>s</sup> .9	34 <sup>s</sup> .48	51 <sup>s</sup> .1	22
23	11 <sup>s</sup> .63	12 <sup>s</sup> .4	46 <sup>s</sup> .63	8 <sup>s</sup> .2	33 <sup>s</sup> .76	60 <sup>s</sup> .6	34 <sup>s</sup> .77	50 <sup>s</sup> .8	23
24	10 <sup>s</sup> .73	12 <sup>s</sup> .4	45 <sup>s</sup> .98	7 <sup>s</sup> .9	33 <sup>s</sup> .53	60 <sup>s</sup> .3	35 <sup>s</sup> .07	50 <sup>s</sup> .6	24
25	9 <sup>s</sup> .83	12 <sup>s</sup> .3	45 <sup>s</sup> .34	7 <sup>s</sup> .7	33 <sup>s</sup> .32	60 <sup>s</sup> .0	35 <sup>s</sup> .39	50 <sup>s</sup> .3	25
26	8 <sup>s</sup> .94	12 <sup>s</sup> .3	44 <sup>s</sup> .71	7 <sup>s</sup> .5	33 <sup>s</sup> .12	59 <sup>s</sup> .7	35 <sup>s</sup> .73	50 <sup>s</sup> .0	26
27	8 <sup>s</sup> .05	12 <sup>s</sup> .2	44 <sup>s</sup> .10	7 <sup>s</sup> .3	32 <sup>s</sup> .93	59 <sup>s</sup> .4	36 <sup>s</sup> .08	49 <sup>s</sup> .8	27
28	7 <sup>s</sup> .16	12 <sup>s</sup> .2	43 <sup>s</sup> .50	7 <sup>s</sup> .0	32 <sup>s</sup> .76	59 <sup>s</sup> .1	36 <sup>s</sup> .44	49 <sup>s</sup> .5	28
29	6 <sup>s</sup> .28	12 <sup>s</sup> .1	42 <sup>s</sup> .91	6 <sup>s</sup> .8	32 <sup>s</sup> .61	58 <sup>s</sup> .8	36 <sup>s</sup> .82	49 <sup>s</sup> .2	29
30	5 <sup>s</sup> .40	12 <sup>s</sup> .0	- -	- -	32 <sup>s</sup> .49	58 <sup>s</sup> .5	37 <sup>s</sup> .21	49 <sup>s</sup> .0	30
31	4 <sup>s</sup> .52	11 <sup>s</sup> .9	- -	- -	32 <sup>s</sup> .38	58 <sup>s</sup> .2	37 <sup>s</sup> .62	48 <sup>s</sup> .7	31
32	3 <sup>s</sup> .65	11 <sup>s</sup> .8	- -	- -	32 <sup>s</sup> .29	57 <sup>s</sup> .8	- -	- -	32



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS (*Polaris*),  
FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	MAY.		JUNE.		JULY.		AUGUST.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> I	<sup>m</sup> IO	<sup>°</sup> 88	<sup>'</sup> 36	<sup>h</sup> I	<sup>m</sup> IO	<sup>°</sup> 88	<sup>'</sup> 36	
1	37 <sup>s</sup> .62	48 <sup>s</sup> .7	56 <sup>s</sup> .41	42 <sup>s</sup> .4	21 <sup>s</sup> .70	41 <sup>s</sup> .1	48 <sup>s</sup> .45	44 <sup>s</sup> .7	1
2	38 <sup>s</sup> .04	48 <sup>s</sup> .4	57 <sup>s</sup> .18	42 <sup>s</sup> .3	22 <sup>s</sup> .59	41 <sup>s</sup> .1	49 <sup>s</sup> .26	44 <sup>s</sup> .9	2
3	38 <sup>s</sup> .48	48 <sup>s</sup> .2	57 <sup>s</sup> .95	42 <sup>s</sup> .2	23 <sup>s</sup> .48	41 <sup>s</sup> .2	50 <sup>s</sup> .06	45 <sup>s</sup> .1	3
4	38 <sup>s</sup> .93	47 <sup>s</sup> .9	58 <sup>s</sup> .73	42 <sup>s</sup> .1	24 <sup>s</sup> .37	41 <sup>s</sup> .2	50 <sup>s</sup> .85	45 <sup>s</sup> .3	4
5	39 <sup>s</sup> .39	47 <sup>s</sup> .7	59 <sup>s</sup> .52	42 <sup>s</sup> .0	25 <sup>s</sup> .25	41 <sup>s</sup> .3	51 <sup>s</sup> .63	45 <sup>s</sup> .5	5
6	39 <sup>s</sup> .87	47 <sup>s</sup> .4	60 <sup>s</sup> .31	41 <sup>s</sup> .9	26 <sup>s</sup> .14	41 <sup>s</sup> .3	52 <sup>s</sup> .41	45 <sup>s</sup> .7	6
7	40 <sup>s</sup> .36	47 <sup>s</sup> .2	61 <sup>s</sup> .11	41 <sup>s</sup> .8	27 <sup>s</sup> .03	41 <sup>s</sup> .4	53 <sup>s</sup> .18	45 <sup>s</sup> .9	7
8	40 <sup>s</sup> .86	46 <sup>s</sup> .9	61 <sup>s</sup> .92	41 <sup>s</sup> .7	27 <sup>s</sup> .91	41 <sup>s</sup> .4	53 <sup>s</sup> .95	46 <sup>s</sup> .1	8
9	41 <sup>s</sup> .38	46 <sup>s</sup> .7	62 <sup>s</sup> .74	41 <sup>s</sup> .6	28 <sup>s</sup> .80	41 <sup>s</sup> .5	54 <sup>s</sup> .71	46 <sup>s</sup> .4	9
10	41 <sup>s</sup> .91	46 <sup>s</sup> .4	63 <sup>s</sup> .56	41 <sup>s</sup> .5	29 <sup>s</sup> .69	41 <sup>s</sup> .6	55 <sup>s</sup> .46	46 <sup>s</sup> .6	10
11	42 <sup>s</sup> .45	46 <sup>s</sup> .2	64 <sup>s</sup> .38	41 <sup>s</sup> .5	30 <sup>s</sup> .57	41 <sup>s</sup> .7	56 <sup>s</sup> .20	46 <sup>s</sup> .9	11
12	43 <sup>s</sup> .01	46 <sup>s</sup> .0	65 <sup>s</sup> .21	41 <sup>s</sup> .4	31 <sup>s</sup> .46	41 <sup>s</sup> .8	56 <sup>s</sup> .94	47 <sup>s</sup> .1	12
13	43 <sup>s</sup> .58	45 <sup>s</sup> .8	66 <sup>s</sup> .05	41 <sup>s</sup> .4	32 <sup>s</sup> .34	41 <sup>s</sup> .9	57 <sup>s</sup> .67	47 <sup>s</sup> .4	13
14	44 <sup>s</sup> .16	45 <sup>s</sup> .6	66 <sup>s</sup> .89	41 <sup>s</sup> .3	33 <sup>s</sup> .22	42 <sup>s</sup> .0	58 <sup>s</sup> .39	47 <sup>s</sup> .6	14
15	44 <sup>s</sup> .75	45 <sup>s</sup> .4	67 <sup>s</sup> .73	41 <sup>s</sup> .3	34 <sup>s</sup> .09	42 <sup>s</sup> .1	59 <sup>s</sup> .10	47 <sup>s</sup> .9	15
16	45 <sup>s</sup> .35	45 <sup>s</sup> .2	68 <sup>s</sup> .58	41 <sup>s</sup> .2	34 <sup>s</sup> .96	42 <sup>s</sup> .2	59 <sup>s</sup> .81	48 <sup>s</sup> .1	16
17	45 <sup>s</sup> .96	45 <sup>s</sup> .0	69 <sup>s</sup> .43	41 <sup>s</sup> .2	35 <sup>s</sup> .83	42 <sup>s</sup> .3	60 <sup>s</sup> .51	48 <sup>s</sup> .4	17
18	46 <sup>s</sup> .59	44 <sup>s</sup> .8	70 <sup>s</sup> .29	41 <sup>s</sup> .1	36 <sup>s</sup> .70	42 <sup>s</sup> .4	61 <sup>s</sup> .20	48 <sup>s</sup> .7	18
19	47 <sup>s</sup> .23	44 <sup>s</sup> .6	71 <sup>s</sup> .15	41 <sup>s</sup> .1	37 <sup>s</sup> .57	42 <sup>s</sup> .5	61 <sup>s</sup> .88	49 <sup>s</sup> .0	19
20	47 <sup>s</sup> .88	44 <sup>s</sup> .4	72 <sup>s</sup> .02	41 <sup>s</sup> .0	38 <sup>s</sup> .43	42 <sup>s</sup> .7	62 <sup>s</sup> .55	49 <sup>s</sup> .2	20
21	48 <sup>s</sup> .54	44 <sup>s</sup> .2	72 <sup>s</sup> .89	41 <sup>s</sup> .0	39 <sup>s</sup> .29	42 <sup>s</sup> .8	63 <sup>s</sup> .21	49 <sup>s</sup> .5	21
22	49 <sup>s</sup> .20	44 <sup>s</sup> .0	73 <sup>s</sup> .76	41 <sup>s</sup> .0	40 <sup>s</sup> .15	43 <sup>s</sup> .0	63 <sup>s</sup> .87	49 <sup>s</sup> .8	22
23	49 <sup>s</sup> .88	43 <sup>s</sup> .9	74 <sup>s</sup> .63	40 <sup>s</sup> .9	41 <sup>s</sup> .00	43 <sup>s</sup> .1	64 <sup>s</sup> .52	50 <sup>s</sup> .1	23
24	50 <sup>s</sup> .57	43 <sup>s</sup> .7	75 <sup>s</sup> .51	40 <sup>s</sup> .9	41 <sup>s</sup> .84	43 <sup>s</sup> .3	65 <sup>s</sup> .16	50 <sup>s</sup> .4	24
25	51 <sup>s</sup> .27	43 <sup>s</sup> .6	76 <sup>s</sup> .39	40 <sup>s</sup> .9	42 <sup>s</sup> .68	43 <sup>s</sup> .4	65 <sup>s</sup> .79	50 <sup>s</sup> .7	25
26	51 <sup>s</sup> .98	43 <sup>s</sup> .4	77 <sup>s</sup> .27	40 <sup>s</sup> .9	43 <sup>s</sup> .52	43 <sup>s</sup> .6	66 <sup>s</sup> .41	51 <sup>s</sup> .0	26
27	52 <sup>s</sup> .70	43 <sup>s</sup> .3	78 <sup>s</sup> .16	41 <sup>s</sup> .0	44 <sup>s</sup> .36	43 <sup>s</sup> .7	67 <sup>s</sup> .02	51 <sup>s</sup> .3	27
28	53 <sup>s</sup> .42	43 <sup>s</sup> .1	79 <sup>s</sup> .04	41 <sup>s</sup> .0	45 <sup>s</sup> .19	43 <sup>s</sup> .9	67 <sup>s</sup> .62	51 <sup>s</sup> .6	28
29	54 <sup>s</sup> .15	42 <sup>s</sup> .9	79 <sup>s</sup> .93	41 <sup>s</sup> .0	46 <sup>s</sup> .01	44 <sup>s</sup> .1	68 <sup>s</sup> .20	51 <sup>s</sup> .9	29
30	54 <sup>s</sup> .89	42 <sup>s</sup> .8	80 <sup>s</sup> .81	41 <sup>s</sup> .0	46 <sup>s</sup> .83	44 <sup>s</sup> .3	68 <sup>s</sup> .78	52 <sup>s</sup> .2	30
31	55 <sup>s</sup> .65	42 <sup>s</sup> .6	81 <sup>s</sup> .70	41 <sup>s</sup> .1	47 <sup>s</sup> .64	44 <sup>s</sup> .5	69 <sup>s</sup> .35	52 <sup>s</sup> .5	31
32	56 <sup>s</sup> .41	42 <sup>s</sup> .4	- -	- -	48 <sup>s</sup> .45	44 <sup>s</sup> .7	69 <sup>s</sup> .91	52 <sup>s</sup> .9	32



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS (*Polaris*),  
FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> 1	<sup>m</sup> 12	<sup>°</sup> 88	<sup>'</sup> 36	<sup>h</sup> 1	<sup>m</sup> 12	<sup>°</sup> 88	<sup>'</sup> 37	
1	9 <sup>s</sup> 91	52 <sup>s</sup> 9	21 <sup>s</sup> 42	3 <sup>s</sup> 6	20 <sup>s</sup> 95	15 <sup>s</sup> 3	67 <sup>s</sup> 80	25 <sup>s</sup> 0	1
2	10 <sup>s</sup> 46	53 <sup>s</sup> 2	21 <sup>s</sup> 61	3 <sup>s</sup> 9	20 <sup>s</sup> 71	15 <sup>s</sup> 7	67 <sup>s</sup> 16	25 <sup>s</sup> 3	2
3	11 <sup>s</sup> 00	53 <sup>s</sup> 5	21 <sup>s</sup> 79	4 <sup>s</sup> 3	20 <sup>s</sup> 46	16 <sup>s</sup> 0	66 <sup>s</sup> 52	25 <sup>s</sup> 6	3
4	11 <sup>s</sup> 53	53 <sup>s</sup> 8	21 <sup>s</sup> 96	4 <sup>s</sup> 7	20 <sup>s</sup> 20	16 <sup>s</sup> 4	65 <sup>s</sup> 86	25 <sup>s</sup> 8	4
5	12 <sup>s</sup> 05	54 <sup>s</sup> 1	22 <sup>s</sup> 11	5 <sup>s</sup> 1	19 <sup>s</sup> 92	16 <sup>s</sup> 8	65 <sup>s</sup> 19	26 <sup>s</sup> 1	5
6	12 <sup>s</sup> 56	54 <sup>s</sup> 4	22 <sup>s</sup> 25	5 <sup>s</sup> 5	19 <sup>s</sup> 62	17 <sup>s</sup> 1	64 <sup>s</sup> 51	26 <sup>s</sup> 4	6
7	13 <sup>s</sup> 05	54 <sup>s</sup> 7	22 <sup>s</sup> 37	5 <sup>s</sup> 8	19 <sup>s</sup> 31	17 <sup>s</sup> 5	63 <sup>s</sup> 82	26 <sup>s</sup> 7	7
8	13 <sup>s</sup> 53	55 <sup>s</sup> 1	22 <sup>s</sup> 48	6 <sup>s</sup> 2	18 <sup>s</sup> 98	17 <sup>s</sup> 8	63 <sup>s</sup> 12	26 <sup>s</sup> 9	8
9	14 <sup>s</sup> 00	55 <sup>s</sup> 4	22 <sup>s</sup> 58	6 <sup>s</sup> 6	18 <sup>s</sup> 64	18 <sup>s</sup> 2	62 <sup>s</sup> 41	27 <sup>s</sup> 1	9
10	14 <sup>s</sup> 47	55 <sup>s</sup> 8	22 <sup>s</sup> 66	7 <sup>s</sup> 0	18 <sup>s</sup> 29	18 <sup>s</sup> 5	61 <sup>s</sup> 69	27 <sup>s</sup> 4	10
11	14 <sup>s</sup> 92	56 <sup>s</sup> 1	22 <sup>s</sup> 73	7 <sup>s</sup> 3	17 <sup>s</sup> 92	18 <sup>s</sup> 9	60 <sup>s</sup> 95	27 <sup>s</sup> 6	11
12	15 <sup>s</sup> 36	56 <sup>s</sup> 5	22 <sup>s</sup> 79	7 <sup>s</sup> 7	17 <sup>s</sup> 54	19 <sup>s</sup> 2	60 <sup>s</sup> 20	27 <sup>s</sup> 8	12
13	15 <sup>s</sup> 79	56 <sup>s</sup> 8	22 <sup>s</sup> 83	8 <sup>s</sup> 1	17 <sup>s</sup> 15	19 <sup>s</sup> 6	59 <sup>s</sup> 44	28 <sup>s</sup> 1	13
14	16 <sup>s</sup> 20	57 <sup>s</sup> 2	22 <sup>s</sup> 86	8 <sup>s</sup> 5	16 <sup>s</sup> 74	19 <sup>s</sup> 9	58 <sup>s</sup> 67	28 <sup>s</sup> 3	14
15	16 <sup>s</sup> 61	57 <sup>s</sup> 5	22 <sup>s</sup> 87	8 <sup>s</sup> 8	16 <sup>s</sup> 32	20 <sup>s</sup> 3	57 <sup>s</sup> 90	28 <sup>s</sup> 5	15
16	17 <sup>s</sup> 01	57 <sup>s</sup> 9	22 <sup>s</sup> 87	9 <sup>s</sup> 2	15 <sup>s</sup> 89	20 <sup>s</sup> 6	57 <sup>s</sup> 12	28 <sup>s</sup> 7	16
17	17 <sup>s</sup> 39	58 <sup>s</sup> 3	22 <sup>s</sup> 86	9 <sup>s</sup> 6	15 <sup>s</sup> 44	20 <sup>s</sup> 9	56 <sup>s</sup> 34	28 <sup>s</sup> 9	17
18	17 <sup>s</sup> 76	58 <sup>s</sup> 7	22 <sup>s</sup> 84	10 <sup>s</sup> 0	14 <sup>s</sup> 98	21 <sup>s</sup> 2	55 <sup>s</sup> 55	29 <sup>s</sup> 1	18
19	18 <sup>s</sup> 11	59 <sup>s</sup> 1	22 <sup>s</sup> 80	10 <sup>s</sup> 3	14 <sup>s</sup> 50	21 <sup>s</sup> 6	54 <sup>s</sup> 75	29 <sup>s</sup> 2	19
20	18 <sup>s</sup> 46	59 <sup>s</sup> 4	22 <sup>s</sup> 74	10 <sup>s</sup> 7	14 <sup>s</sup> 01	21 <sup>s</sup> 9	53 <sup>s</sup> 94	29 <sup>s</sup> 4	20
21	18 <sup>s</sup> 79	59 <sup>s</sup> 8	22 <sup>s</sup> 67	11 <sup>s</sup> 1	13 <sup>s</sup> 51	22 <sup>s</sup> 2	53 <sup>s</sup> 12	29 <sup>s</sup> 6	21
22	19 <sup>s</sup> 11	60 <sup>s</sup> 2	22 <sup>s</sup> 58	11 <sup>s</sup> 5	13 <sup>s</sup> 00	22 <sup>s</sup> 5	52 <sup>s</sup> 29	29 <sup>s</sup> 8	22
23	19 <sup>s</sup> 42	60 <sup>s</sup> 5	22 <sup>s</sup> 48	11 <sup>s</sup> 9	12 <sup>s</sup> 47	22 <sup>s</sup> 8	51 <sup>s</sup> 45	29 <sup>s</sup> 9	23
24	19 <sup>s</sup> 72	60 <sup>s</sup> 9	22 <sup>s</sup> 37	12 <sup>s</sup> 2	11 <sup>s</sup> 93	23 <sup>s</sup> 1	50 <sup>s</sup> 61	30 <sup>s</sup> 1	24
25	20 <sup>s</sup> 00	61 <sup>s</sup> 3	22 <sup>s</sup> 24	12 <sup>s</sup> 6	11 <sup>s</sup> 38	23 <sup>s</sup> 4	49 <sup>s</sup> 76	30 <sup>s</sup> 3	25
26	20 <sup>s</sup> 27	61 <sup>s</sup> 7	22 <sup>s</sup> 10	13 <sup>s</sup> 0	10 <sup>s</sup> 82	23 <sup>s</sup> 7	48 <sup>s</sup> 90	30 <sup>s</sup> 5	26
27	20 <sup>s</sup> 53	62 <sup>s</sup> 0	21 <sup>s</sup> 94	13 <sup>s</sup> 4	10 <sup>s</sup> 24	24 <sup>s</sup> 0	48 <sup>s</sup> 04	30 <sup>s</sup> 6	27
28	20 <sup>s</sup> 77	62 <sup>s</sup> 4	21 <sup>s</sup> 77	13 <sup>s</sup> 8	9 <sup>s</sup> 65	24 <sup>s</sup> 2	47 <sup>s</sup> 17	30 <sup>s</sup> 7	28
29	21 <sup>s</sup> 00	62 <sup>s</sup> 8	21 <sup>s</sup> 59	14 <sup>s</sup> 2	9 <sup>s</sup> 05	24 <sup>s</sup> 5	46 <sup>s</sup> 30	30 <sup>s</sup> 8	29
30	21 <sup>s</sup> 22	63 <sup>s</sup> 2	21 <sup>s</sup> 39	14 <sup>s</sup> 6	8 <sup>s</sup> 43	24 <sup>s</sup> 8	45 <sup>s</sup> 42	30 <sup>s</sup> 9	30
31	21 <sup>s</sup> 42	63 <sup>s</sup> 6	21 <sup>s</sup> 18	14 <sup>s</sup> 9	7 <sup>s</sup> 80	25 <sup>s</sup> 0	44 <sup>s</sup> 54	31 <sup>s</sup> 0	31
32	- -	- -	20 <sup>s</sup> 95	15 <sup>s</sup> 3	- -	- -	43 <sup>s</sup> 65	31 <sup>s</sup> 1	32



## - APPARENT PLACES OF $\delta$ URSÆ MINORIS, FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	
1	59 <sup>s</sup> 83	22 <sup>"</sup> 9	3 <sup>s</sup> 10	12 <sup>"</sup> 8	10 <sup>s</sup> 92	6 <sup>"</sup> 6	21 <sup>s</sup> 96	5 <sup>"</sup> 2	1
2	59 <sup>s</sup> 83	22 <sup>"</sup> 5	3 <sup>s</sup> 31	12 <sup>"</sup> 6	11 <sup>s</sup> 26	6 <sup>"</sup> 5	22 <sup>s</sup> 31	5 <sup>"</sup> 2	2
3	59 <sup>s</sup> 84	22 <sup>"</sup> 12	3 <sup>s</sup> 53	12 <sup>"</sup> 3	11 <sup>s</sup> 60	6 <sup>"</sup> 4	22 <sup>s</sup> 66	5 <sup>"</sup> 3	3
4	59 <sup>s</sup> 85	21 <sup>"</sup> 8	3 <sup>s</sup> 75	12 <sup>"</sup> 0	11 <sup>s</sup> 94	6 <sup>"</sup> 3	23 <sup>s</sup> 01	5 <sup>"</sup> 4	4
5	59 <sup>s</sup> 87	21 <sup>"</sup> 5	3 <sup>s</sup> 98	11 <sup>"</sup> 7	12 <sup>s</sup> 28	6 <sup>"</sup> 2	23 <sup>s</sup> 36	5 <sup>"</sup> 4	5
6	59 <sup>s</sup> 90	21 <sup>"</sup> 1	4 <sup>s</sup> 22	11 <sup>"</sup> 5	12 <sup>s</sup> 63	6 <sup>"</sup> 1	23 <sup>s</sup> 71	5 <sup>"</sup> 5	6
7	59 <sup>s</sup> 94	20 <sup>"</sup> 8	4 <sup>s</sup> 46	11 <sup>"</sup> 2	12 <sup>s</sup> 98	6 <sup>"</sup> 0	24 <sup>s</sup> 05	5 <sup>"</sup> 6	7
8	59 <sup>s</sup> 98	20 <sup>"</sup> 5	4 <sup>s</sup> 70	10 <sup>"</sup> 9	13 <sup>s</sup> 33	5 <sup>"</sup> 9	24 <sup>s</sup> 39	5 <sup>"</sup> 7	8
9	60 <sup>s</sup> 03	20 <sup>"</sup> 1	4 <sup>s</sup> 95	10 <sup>"</sup> 6	13 <sup>s</sup> 68	5 <sup>"</sup> 8	24 <sup>s</sup> 73	5 <sup>"</sup> 8	9
10	60 <sup>s</sup> 09	19 <sup>"</sup> 8	5 <sup>s</sup> 21	10 <sup>"</sup> 4	14 <sup>s</sup> 03	5 <sup>"</sup> 7	25 <sup>s</sup> 06	5 <sup>"</sup> 9	10
11	60 <sup>s</sup> 15	19 <sup>"</sup> 5	5 <sup>s</sup> 47	10 <sup>"</sup> 1	14 <sup>s</sup> 39	5 <sup>"</sup> 6	25 <sup>s</sup> 40	6 <sup>"</sup> 0	11
12	60 <sup>s</sup> 22	19 <sup>"</sup> 1	5 <sup>s</sup> 74	9 <sup>"</sup> 9	14 <sup>s</sup> 75	5 <sup>"</sup> 5	25 <sup>s</sup> 74	6 <sup>"</sup> 1	12
13	60 <sup>s</sup> 30	18 <sup>"</sup> 8	6 <sup>s</sup> 01	9 <sup>"</sup> 7	15 <sup>s</sup> 11	5 <sup>"</sup> 4	26 <sup>s</sup> 07	6 <sup>"</sup> 3	13
14	60 <sup>s</sup> 39	18 <sup>"</sup> 4	6 <sup>s</sup> 28	9 <sup>"</sup> 4	15 <sup>s</sup> 47	5 <sup>"</sup> 4	26 <sup>s</sup> 40	6 <sup>"</sup> 4	14
15	60 <sup>s</sup> 48	18 <sup>"</sup> 1	6 <sup>s</sup> 56	9 <sup>"</sup> 2	15 <sup>s</sup> 83	5 <sup>"</sup> 3	26 <sup>s</sup> 72	6 <sup>"</sup> 6	15
16	60 <sup>s</sup> 58	17 <sup>"</sup> 8	6 <sup>s</sup> 85	9 <sup>"</sup> 0	16 <sup>s</sup> 19	5 <sup>"</sup> 3	27 <sup>s</sup> 04	6 <sup>"</sup> 7	16
17	60 <sup>s</sup> 69	17 <sup>"</sup> 4	7 <sup>s</sup> 14	8 <sup>"</sup> 8	16 <sup>s</sup> 55	5 <sup>"</sup> 2	27 <sup>s</sup> 36	6 <sup>"</sup> 8	17
18	60 <sup>s</sup> 80	17 <sup>"</sup> 1	7 <sup>s</sup> 44	8 <sup>"</sup> 6	16 <sup>s</sup> 91	5 <sup>"</sup> 2	27 <sup>s</sup> 67	7 <sup>"</sup> 0	18
19	60 <sup>s</sup> 92	16 <sup>"</sup> 8	7 <sup>s</sup> 74	8 <sup>"</sup> 4	17 <sup>s</sup> 27	5 <sup>"</sup> 1	27 <sup>s</sup> 98	7 <sup>"</sup> 1	19
20	61 <sup>s</sup> 05	16 <sup>"</sup> 5	8 <sup>s</sup> 04	8 <sup>"</sup> 2	17 <sup>s</sup> 63	5 <sup>"</sup> 1	28 <sup>s</sup> 28	7 <sup>"</sup> 3	20
21	61 <sup>s</sup> 18	16 <sup>"</sup> 2	8 <sup>s</sup> 34	8 <sup>"</sup> 0	18 <sup>s</sup> 00	5 <sup>"</sup> 0	28 <sup>s</sup> 58	7 <sup>"</sup> 4	21
22	61 <sup>s</sup> 32	15 <sup>"</sup> 8	8 <sup>s</sup> 65	7 <sup>"</sup> 8	18 <sup>s</sup> 37	5 <sup>"</sup> 0	28 <sup>s</sup> 88	7 <sup>"</sup> 6	22
23	61 <sup>s</sup> 47	15 <sup>"</sup> 5	8 <sup>s</sup> 96	7 <sup>"</sup> 6	18 <sup>s</sup> 73	5 <sup>"</sup> 0	29 <sup>s</sup> 18	7 <sup>"</sup> 7	23
24	61 <sup>s</sup> 63	15 <sup>"</sup> 2	9 <sup>s</sup> 28	7 <sup>"</sup> 5	19 <sup>s</sup> 09	4 <sup>"</sup> 9	29 <sup>s</sup> 47	7 <sup>"</sup> 9	24
25	61 <sup>s</sup> 79	14 <sup>"</sup> 9	9 <sup>s</sup> 60	7 <sup>"</sup> 3	19 <sup>s</sup> 45	4 <sup>"</sup> 9	29 <sup>s</sup> 76	8 <sup>"</sup> 1	25
26	61 <sup>s</sup> 96	14 <sup>"</sup> 6	9 <sup>s</sup> 93	7 <sup>"</sup> 1	19 <sup>s</sup> 81	4 <sup>"</sup> 9	30 <sup>s</sup> 04	8 <sup>"</sup> 3	26
27	62 <sup>s</sup> 13	14 <sup>"</sup> 3	10 <sup>s</sup> 26	7 <sup>"</sup> 0	20 <sup>s</sup> 17	4 <sup>"</sup> 9	30 <sup>s</sup> 32	8 <sup>"</sup> 5	27
28	62 <sup>s</sup> 31	14 <sup>"</sup> 0	10 <sup>s</sup> 59	6 <sup>"</sup> 8	20 <sup>s</sup> 53	5 <sup>"</sup> 0	30 <sup>s</sup> 59	8 <sup>"</sup> 7	28
29	62 <sup>s</sup> 50	13 <sup>"</sup> 7	10 <sup>s</sup> 92	6 <sup>"</sup> 6	20 <sup>s</sup> 89	5 <sup>"</sup> 0	30 <sup>s</sup> 86	8 <sup>"</sup> 9	29
30	62 <sup>s</sup> 69	13 <sup>"</sup> 4	- -	- -	21 <sup>s</sup> 25	5 <sup>"</sup> 1	31 <sup>s</sup> 12	9 <sup>"</sup> 1	30
31	62 <sup>s</sup> 89	13 <sup>"</sup> 1	- -	- -	21 <sup>s</sup> 61	5 <sup>"</sup> 1	31 <sup>s</sup> 38	9 <sup>"</sup> 3	31
32	63 <sup>s</sup> 10	12 <sup>"</sup> 8	- -	- -	21 <sup>s</sup> 96	5 <sup>"</sup> 2	- -	- -	32



APPARENT PLACES OF  $\delta$  URSÆ MINORIS,  
FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	MAY.		JUNE.		JULY.		AUGUST.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	
1	31 <sup>s</sup> .38	9.3	36 <sup>s</sup> .72	17.6	36 <sup>s</sup> .24	26 <sup>s</sup> .9	30 <sup>s</sup> .03	35 <sup>s</sup> .4	1
2	31 <sup>s</sup> .63	9.5	36 <sup>s</sup> .80	17.9	36 <sup>s</sup> .13	27.2	29.74	35.7	2
3	31 <sup>s</sup> .88	9.8	36 <sup>s</sup> .87	18.2	36 <sup>s</sup> .01	27.5	29.45	35.9	3
4	32.12	10.0	36.94	18.5	35.88	27.8	29.16	36.1	4
5	32.36	10.2	37.00	18.8	35.75	28.1	28.86	36.3	5
6	32.60	10.4	37.05	19.1	35.61	28.4	28.56	36.6	6
7	32.83	10.7	37.09	19.4	35.47	28.7	28.25	36.8	7
8	33.06	10.9	37.13	19.7	35.32	29.0	27.94	37.0	8
9	33.28	11.2	37.16	20.0	35.16	29.3	27.62	37.3	9
10	33.49	11.4	37.19	20.3	35.00	29.6	27.30	37.5	10
11	33.70	11.7	37.21	20.7	34.83	29.9	26.98	37.7	11
12	33.90	12.0	37.22	21.0	34.65	30.2	26.65	37.9	12
13	34.10	12.2	37.22	21.3	34.47	30.4	26.32	38.1	13
14	34.29	12.5	37.22	21.6	34.29	30.7	25.98	38.3	14
15	34.47	12.7	37.22	21.9	34.10	31.0	25.64	38.5	15
16	34.65	13.0	37.21	22.2	33.90	31.3	25.30	38.7	16
17	34.83	13.2	37.19	22.5	33.70	31.6	24.95	38.9	17
18	35.00	13.5	37.16	22.9	33.49	31.8	24.60	39.1	18
19	35.16	13.7	37.13	23.2	33.28	32.1	24.25	39.2	19
20	35.32	14.0	37.09	23.5	33.06	32.4	23.89	39.4	20
21	35.47	14.3	37.05	23.8	32.83	32.6	23.53	39.5	21
22	35.61	14.6	37.00	24.2	32.60	32.9	23.16	39.7	22
23	35.75	14.9	36.94	24.5	32.36	33.2	22.79	39.8	23
24	35.88	15.2	36.87	24.8	32.12	33.4	22.42	40.0	24
25	36.01	15.5	36.80	25.1	31.88	33.7	22.05	40.1	25
26	36.13	15.8	36.72	25.4	31.63	34.0	21.67	40.3	26
27	36.25	16.1	36.64	25.7	31.38	34.2	21.29	40.4	27
28	36.36	16.4	36.55	26.0	31.12	34.5	20.91	40.6	28
29	36.46	16.7	36.45	26.3	30.85	34.7	20.52	40.7	29
30	36.55	17.0	36.35	26.6	30.58	35.0	20.13	40.9	30
31	36.64	17.3	36.24	26.9	30.31	35.2	19.74	41.0	31
32	36.72	17.6	-	-	30.03	35.4	19.34	41.1	32



## APPARENT PLACES OF $\delta$ URSÆ MINORIS, FOR THE UPPER TRANSIT AT GREENWICH.

Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Day of the Month.
	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	R. A.	Dec. N.	
	<sup>h</sup> <sup>m</sup> 18 14	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36	<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36	
1	19° 34	41° 1	66° 79	42° 4	54° 11	39° 3	44° 87	31° 9	1
2	18° 95	41° 2	66° 36	42° 4	53° 74	39° 1	44° 65	31° 6	2
3	18° 55	41° 3	65° 93	42° 3	53° 37	38° 9	44° 43	31° 3	3
4	18° 15	41° 4	65° 50	42° 3	53° 01	38° 7	44° 21	31° 0	4
5	17° 75	41° 5	65° 07	42° 3	52° 65	38° 5	44° 00	30° 7	5
6	17° 34	41° 6	64° 64	42° 3	52° 29	38° 3	43° 80	30° 4	6
7	16° 93	41° 7	64° 22	42° 2	51° 94	38° 1	43° 61	30° 1	7
8	16° 52	41° 8	63° 79	42° 2	51° 59	37° 8	43° 42	29° 8	8
9	16° 11	41° 9	63° 37	42° 1	51° 25	37° 6	43° 24	29° 5	9
10	15° 70	42° 0	62° 95	42° 1	50° 91	37° 4	43° 06	29° 1	10
11	15° 29	42° 1	62° 53	42° 0	50° 57	37° 1	42° 89	28° 8	11
12	14° 88	42° 1	62° 11	41° 9	50° 24	36° 9	42° 72	28° 4	12
13	14° 46	42° 2	61° 69	41° 8	49° 91	36° 7	42° 57	28° 1	13
14	14° 04	42° 2	61° 27	41° 7	49° 59	36° 4	42° 42	27° 8	14
15	13° 62	42° 3	60° 85	41° 6	49° 27	36° 2	42° 28	27° 4	15
16	13° 19	42° 3	60° 44	41° 5	48° 95	36° 0	42° 15	27° 1	16
17	12° 77	42° 4	60° 03	41° 4	48° 64	35° 8	42° 02	26° 8	17
18	12° 35	42° 4	59° 62	41° 3	48° 34	35° 5	41° 90	26° 5	18
19	11° 92	42° 4	59° 21	41° 2	48° 04	35° 2	41° 78	26° 1	19
20	11° 50	42° 4	58° 80	41° 0	47° 75	35° 0	41° 67	25° 8	20
21	11° 08	42° 5	58° 39	40° 9	47° 46	34° 7	41° 57	25° 5	21
22	10° 65	42° 5	57° 99	40° 8	47° 18	34° 5	41° 48	25° 2	22
23	10° 22	42° 5	57° 59	40° 7	46° 90	34° 2	41° 40	24° 8	23
24	9° 79	42° 5	57° 19	40° 5	46° 62	33° 9	{41° 31}	{24° 1}	24
25	9° 36	42° 5	56° 80	40° 4	46° 35	33° 7	41° 19	23° 8	25
26	8° 93	42° 5	56° 41	40° 3	46° 09	33° 4	41° 13	23° 4	26
27	8° 50	42° 5	56° 02	40° 2	45° 84	33° 1	41° 08	23° 0	27
28	8° 07	42° 5	55° 63	40° 0	45° 59	32° 8	41° 04	22° 7	28
29	7° 64	42° 4	55° 24	39° 9	45° 34	32° 5	41° 01	22° 3	29
30	7° 21	42° 4	54° 86	39° 7	45° 10	32° 2	40° 98	21° 9	30
31	6° 79	42° 4	54° 48	39° 5	44° 87	31° 9	40° 96	21° 6	31
32	- -	- -	54° 11	39° 3	- -	- -	40° 95	21° 2	32



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Andromedæ.			$\gamma$ Pegasi. (Algenib)			$\beta$ Hydri.		
	R. A.		Dec. North.	R. A.		Dec. North.	R. A.		Dec. South.
	h	m	°	h	m	°	h	m	°
	0	1	28 22	0	6	14 27	0	18	77 58
Jan. 1	39 <sup>26</sup>	0 <sup>14</sup>	23 <sup>9</sup>	31 <sup>53</sup>	0 <sup>12</sup>	36 <sup>0</sup>	50 <sup>00</sup>	0 <sup>88</sup>	100 <sup>8</sup>
11	39 <sup>12</sup>	0 <sup>14</sup>	22 <sup>9</sup>	31 <sup>41</sup>	0 <sup>12</sup>	35 <sup>1</sup>	49 <sup>12</sup>	0 <sup>82</sup>	99 <sup>6</sup>
21	38 <sup>08</sup>	0 <sup>13</sup>	21 <sup>7</sup>	31 <sup>29</sup>	0 <sup>10</sup>	34 <sup>1</sup>	48 <sup>30</sup>	0 <sup>73</sup>	97 <sup>9</sup>
31	38 <sup>85</sup>	0 <sup>10</sup>	20 <sup>2</sup>	31 <sup>19</sup>	0 <sup>09</sup>	33 <sup>0</sup>	47 <sup>57</sup>	0 <sup>63</sup>	95 <sup>7</sup>
Feb. 10	38 <sup>75</sup>	0 <sup>08</sup>	18 <sup>6</sup>	31 <sup>10</sup>	0 <sup>06</sup>	31 <sup>9</sup>	46 <sup>94</sup>	0 <sup>50</sup>	93 <sup>0</sup>
20	38 <sup>67</sup>	0 <sup>04</sup>	16 <sup>9</sup>	31 <sup>04</sup>	0 <sup>04</sup>	30 <sup>9</sup>	46 <sup>44</sup>	0 <sup>36</sup>	89 <sup>9</sup>
Mar. 2	38 <sup>63</sup>	0 <sup>01</sup>	15 <sup>3</sup>	31 <sup>00</sup>	0 <sup>01</sup>	30 <sup>0</sup>	46 <sup>08</sup>	0 <sup>21</sup>	86 <sup>5</sup>
12	38 <sup>62</sup>	0 <sup>04</sup>	13 <sup>7</sup>	30 <sup>99</sup>	0 <sup>04</sup>	29 <sup>2</sup>	45 <sup>87</sup>	0 <sup>06</sup>	82 <sup>9</sup>
22	38 <sup>66</sup>	0 <sup>08</sup>	12 <sup>3</sup>	{ 31 <sup>03</sup> }	0 <sup>08</sup>	{ 28 <sup>2</sup> }	45 <sup>81</sup>	0 <sup>12</sup>	79 <sup>1</sup>
Apr. 1	38 <sup>74</sup>	0 <sup>13</sup>	11 <sup>1</sup>	31 <sup>11</sup>	0 <sup>12</sup>	28 <sup>2</sup>	45 <sup>93</sup>	0 <sup>28</sup>	75 <sup>0</sup>
11	38 <sup>87</sup>	0 <sup>18</sup>	10 <sup>2</sup>	31 <sup>23</sup>	0 <sup>16</sup>	28 <sup>2</sup>	46 <sup>21</sup>	0 <sup>44</sup>	71 <sup>1</sup>
21	39 <sup>05</sup>	0 <sup>22</sup>	9 <sup>7</sup>	31 <sup>39</sup>	0 <sup>20</sup>	28 <sup>4</sup>	46 <sup>65</sup>	0 <sup>58</sup>	67 <sup>4</sup>
May 1	39 <sup>27</sup>	0 <sup>26</sup>	9 <sup>6</sup>	31 <sup>59</sup>	0 <sup>23</sup>	28 <sup>9</sup>	47 <sup>23</sup>	0 <sup>72</sup>	63 <sup>9</sup>
11	39 <sup>53</sup>	0 <sup>29</sup>	9 <sup>9</sup>	31 <sup>82</sup>	0 <sup>27</sup>	29 <sup>8</sup>	47 <sup>95</sup>	0 <sup>85</sup>	60 <sup>7</sup>
21	39 <sup>82</sup>	0 <sup>31</sup>	10 <sup>5</sup>	32 <sup>09</sup>	0 <sup>29</sup>	31 <sup>0</sup>	48 <sup>80</sup>	0 <sup>96</sup>	57 <sup>8</sup>
31	40 <sup>13</sup>	0 <sup>33</sup>	11 <sup>6</sup>	32 <sup>38</sup>	0 <sup>31</sup>	32 <sup>5</sup>	49 <sup>76</sup>	1 <sup>04</sup>	55 <sup>3</sup>
June 10	40 <sup>46</sup>	0 <sup>34</sup>	13 <sup>0</sup>	32 <sup>69</sup>	0 <sup>32</sup>	34 <sup>2</sup>	50 <sup>80</sup>	1 <sup>11</sup>	53 <sup>3</sup>
20	40 <sup>80</sup>	0 <sup>34</sup>	14 <sup>7</sup>	33 <sup>01</sup>	0 <sup>32</sup>	36 <sup>1</sup>	51 <sup>09</sup>	1 <sup>14</sup>	51 <sup>8</sup>
30	41 <sup>14</sup>	0 <sup>33</sup>	16 <sup>7</sup>	33 <sup>33</sup>	0 <sup>31</sup>	38 <sup>1</sup>	53 <sup>05</sup>	1 <sup>14</sup>	50 <sup>8</sup>
July 10	41 <sup>47</sup>	0 <sup>31</sup>	18 <sup>9</sup>	33 <sup>64</sup>	0 <sup>30</sup>	40 <sup>2</sup>	54 <sup>19</sup>	1 <sup>11</sup>	50 <sup>4</sup>
20	41 <sup>78</sup>	0 <sup>28</sup>	21 <sup>2</sup>	33 <sup>94</sup>	0 <sup>27</sup>	42 <sup>4</sup>	55 <sup>30</sup>	1 <sup>06</sup>	50 <sup>5</sup>
30	42 <sup>06</sup>	0 <sup>25</sup>	23 <sup>7</sup>	34 <sup>21</sup>	0 <sup>24</sup>	44 <sup>5</sup>	56 <sup>36</sup>	0 <sup>97</sup>	51 <sup>2</sup>
Aug. 9	42 <sup>31</sup>	0 <sup>21</sup>	26 <sup>2</sup>	34 <sup>45</sup>	0 <sup>21</sup>	46 <sup>6</sup>	57 <sup>33</sup>	0 <sup>85</sup>	52 <sup>5</sup>
19	42 <sup>52</sup>	0 <sup>18</sup>	28 <sup>7</sup>	34 <sup>66</sup>	0 <sup>17</sup>	48 <sup>6</sup>	58 <sup>18</sup>	0 <sup>70</sup>	54 <sup>3</sup>
29	42 <sup>70</sup>	0 <sup>13</sup>	31 <sup>1</sup>	34 <sup>83</sup>	0 <sup>13</sup>	50 <sup>4</sup>	58 <sup>88</sup>	0 <sup>54</sup>	56 <sup>5</sup>
Sept. 8	42 <sup>83</sup>	0 <sup>09</sup>	33 <sup>4</sup>	34 <sup>96</sup>	0 <sup>10</sup>	52 <sup>0</sup>	59 <sup>42</sup>	0 <sup>36</sup>	59 <sup>1</sup>
18	42 <sup>92</sup>	0 <sup>05</sup>	35 <sup>6</sup>	35 <sup>06</sup>	0 <sup>06</sup>	53 <sup>5</sup>	59 <sup>78</sup>	0 <sup>17</sup>	62 <sup>0</sup>
28	42 <sup>97</sup>	0 <sup>02</sup>	37 <sup>6</sup>	35 <sup>12</sup>	0 <sup>02</sup>	54 <sup>7</sup>	59 <sup>95</sup>	0 <sup>02</sup>	65 <sup>0</sup>
Oct. 8	42 <sup>99</sup>	0 <sup>02</sup>	39 <sup>4</sup>	35 <sup>14</sup>	0 <sup>01</sup>	55 <sup>7</sup>	59 <sup>93</sup>	0 <sup>22</sup>	68 <sup>1</sup>
18	42 <sup>97</sup>	0 <sup>05</sup>	41 <sup>0</sup>	35 <sup>13</sup>	0 <sup>04</sup>	56 <sup>4</sup>	59 <sup>71</sup>	0 <sup>39</sup>	71 <sup>1</sup>
28	42 <sup>92</sup>	0 <sup>08</sup>	42 <sup>3</sup>	35 <sup>09</sup>	0 <sup>06</sup>	56 <sup>9</sup>	59 <sup>32</sup>	0 <sup>55</sup>	73 <sup>9</sup>
Nov. 7	42 <sup>84</sup>	0 <sup>10</sup>	43 <sup>2</sup>	35 <sup>03</sup>	0 <sup>08</sup>	57 <sup>2</sup>	58 <sup>77</sup>	0 <sup>69</sup>	76 <sup>4</sup>
17	42 <sup>74</sup>	0 <sup>12</sup>	43 <sup>9</sup>	34 <sup>95</sup>	0 <sup>09</sup>	57 <sup>3</sup>	58 <sup>08</sup>	0 <sup>79</sup>	78 <sup>5</sup>
27	42 <sup>62</sup>	0 <sup>13</sup>	44 <sup>3</sup>	34 <sup>86</sup>	0 <sup>11</sup>	57 <sup>2</sup>	57 <sup>29</sup>	0 <sup>87</sup>	80 <sup>1</sup>
Dec. 7	42 <sup>49</sup>	0 <sup>14</sup>	44 <sup>4</sup>	34 <sup>75</sup>	0 <sup>11</sup>	56 <sup>9</sup>	56 <sup>42</sup>	0 <sup>92</sup>	81 <sup>1</sup>
17	42 <sup>35</sup>	0 <sup>14</sup>	44 <sup>1</sup>	34 <sup>64</sup>	0 <sup>12</sup>	56 <sup>4</sup>	55 <sup>50</sup>	0 <sup>92</sup>	81 <sup>6</sup>
27	42 <sup>21</sup>	0 <sup>15</sup>	43 <sup>5</sup>	34 <sup>52</sup>	0 <sup>12</sup>	55 <sup>8</sup>	54 <sup>58</sup>	0 <sup>90</sup>	81 <sup>4</sup>
37	42 <sup>06</sup>	0 <sup>15</sup>	42 <sup>7</sup>	34 <sup>40</sup>	0 <sup>12</sup>	54 <sup>9</sup>	53 <sup>68</sup>	0 <sup>90</sup>	80 <sup>5</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	12 Ceti.		$\alpha$ Cassiopeæ.		$\beta$ Ceti.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. South.
	h m ° 23	° ' 4 40	h m ° 33	° ' 55 49	h m ° 37	° ' 18 41
Jan. I	23° 25' 0.11	43° 0' 0.6	8° 12' 0.30	35° 8' 0.5	2° 65' 0.13	77° 5' 0.4
II	23° 14' 0.12	43° 6' 0.6	7° 82' 0.29	35° 3' 1.0	2° 52' 0.13	77° 9' 0.2
2I	23° 02' 0.10	44° 2' 0.4	7° 53' 0.28	34° 3' 1.5	2° 39' 0.11	78° 1' 0.0
3I	22° 92' 0.09	44° 6' 0.2	7° 25' 0.25	32° 8' 1.9	2° 28' 0.10	78° 1' 0.3
Feb. 10	22° 83' 0.07	44° 8' 0.1	7° 00' 0.21	30° 9' 2.2	2° 18' 0.09	77° 8' 0.6
20	22° 76' 0.05	44° 9' 0.1	6° 79' 0.16	28° 7' 2.5	2° 09' 0.07	77° 2' 0.9
Mar. 2	22° 71' 0.02	44° 8' 0.3	6° 63' 0.10	26° 2' 2.5	2° 02' 0.03	76° 3' 1.1
12	22° 69' 0.02	44° 5' 0.6	6° 53' 0.04	23° 7' 2.6	1° 99' 0.00	75° 2' 1.4
Apr. 22	22° 71' 0.07	43° 9' 0.9	6° 49' 0.04	21° 1' 2.7	1° 99' 0.05	73° 8' 1.8
I	22° 78' 0.10	43° 0' 1.1	6° 53' 0.13	18° 4' 2.2	2° 04' 0.09	72° 0' 1.8
II	22° 88' 0.14	41° 9' 1.3	6° 66' 0.20	16° 2' 1.9	2° 13' 0.12	70° 2' 2.0
2I	23° 02' 0.18	40° 6' 1.5	6° 86' 0.26	14° 3' 1.6	2° 25' 0.17	68° 2' 2.2
May I	23° 20' 0.21	39° 1' 1.7	7° 12' 0.33	12° 7' 1.1	2° 42' 0.21	66° 0' 2.4
II	23° 41' 0.25	37° 4' 1.9	7° 45' 0.38	11° 6' 0.7	2° 63' 0.25	63° 6' 2.5
2I	23° 66' 0.28	35° 5' 2.0	7° 83' 0.43	10° 9' 0.1	2° 88' 0.28	61° 1' 2.4
3I	23° 94' 0.30	33° 5' 2.1	8° 26' 0.45	10° 8' 0.3	3° 16' 0.30	58° 7' 2.3
June 10	24° 24' 0.31	31° 4' 2.0	8° 71' 0.47	11° 1' 0.8	3° 46' 0.31	56° 4' 2.2
20	24° 55' 0.31	29° 4' 2.1	9° 18' 0.48	11° 9' 1.3	3° 77' 0.33	54° 2' 2.0
30	24° 86' 0.31	27° 3' 1.9	9° 66' 0.46	13° 2' 1.8	4° 10' 0.32	52° 2' 1.8
July 10	25° 17' 0.30	25° 4' 1.8	10° 12' 0.44	15° 0' 2.1	4° 42' 0.32	50° 4' 1.6
20	25° 47' 0.28	23° 6' 1.7	10° 56' 0.42	17° 1' 2.4	4° 74' 0.30	48° 8' 1.3
30	25° 75' 0.26	21° 9' 1.4	10° 98' 0.38	19° 5' 2.7	5° 04' 0.27	47° 5' 0.9
Aug. 9	26° 01' 0.22	20° 5' 1.1	11° 36' 0.33	22° 2' 3.0	5° 31' 0.24	46° 6' 0.6
19	26° 23' 0.18	19° 4' 0.9	11° 69' 0.27	25° 2' 3.2	5° 55' 0.21	46° 0' 0.2
29	26° 41' 0.15	18° 5' 0.6	11° 96' 0.22	28° 4' 3.2	5° 76' 0.17	45° 8' 0.2
Sept. 8	26° 56' 0.11	17° 9' 0.3	12° 18' 0.17	31° 6' 3.2	5° 93' 0.14	46° 0' 0.4
18	26° 67' 0.08	17° 6' 0.1	12° 35' 0.11	34° 8' 3.2	6° 07' 0.09	46° 4' 0.8
28	26° 75' 0.04	17° 5' 0.2	12° 46' 0.05	38° 0' 3.1	6° 16' 0.05	47° 2' 1.0
Oct. 8	26° 79' 0.01	17° 7' 0.4	12° 51' 0.01	41° 1' 3.0	6° 21' 0.02	48° 2' 1.1
18	26° 80' 0.02	18° 1' 0.5	12° 50' 0.05	44° 1' 2.7	6° 23' 0.01	49° 3' 1.3
28	26° 78' 0.04	18° 6' 0.7	12° 45' 0.11	46° 8' 2.5	6° 22' 0.04	50° 6' 1.4
Nov. 7	26° 74' 0.07	19° 3' 0.7	12° 34' 0.15	49° 3' 2.1	6° 18' 0.07	52° 0' 1.3
17	26° 67' 0.08	20° 0' 0.8	12° 19' 0.20	51° 4' 1.7	6° 11' 0.09	53° 3' 1.3
27	26° 59' 0.10	20° 8' 0.8	11° 99' 0.23	53° 1' 1.2	6° 02' 0.10	54° 6' 1.2
Dec. 7	26° 49' 0.11	21° 6' 0.8	11° 76' 0.25	54° 3' 0.8	5° 92' 0.12	55° 8' 1.0
17	26° 38' 0.11	22° 4' 0.7	11° 51' 0.28	55° 1' 0.3	5° 80' 0.12	56° 8' 0.8
27	26° 27' 0.11	23° 1' 0.7	11° 23' 0.30	55° 4' 0.2	5° 68' 0.12	57° 6' 0.6
37	26° 16' 0.11	23° 8' 0.7	10° 93' 0.30	55° 2' 0.2	5° 56' 0.12	58° 2' 0.6



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ε Piscium.		θ Ceti.		η Piscium.	
	R. A.	Dec. North.	R. A.	Dec. South.	R. A.	Dec. North.
	<sup>h</sup> 0 56	<sup>m</sup> 7 11	<sup>h</sup> 1 17	<sup>m</sup> 8 51	<sup>h</sup> 1 24	<sup>m</sup> 14 40
Jan. 1	11 <sup>11</sup> 14 <sup>12</sup>	16 <sup>6</sup> 7 <sup>11</sup>	30 <sup>77</sup> 1 <sup>13</sup>	30 <sup>0</sup> 8 <sup>7</sup>	31 <sup>12</sup> 1 <sup>12</sup>	25 <sup>6</sup> 0 <sup>6</sup>
11	11 <sup>02</sup> 0 <sup>13</sup>	15 <sup>9</sup> 0 <sup>7</sup>	30 <sup>64</sup> 0 <sup>13</sup>	30 <sup>7</sup> 0 <sup>6</sup>	31 <sup>00</sup> 0 <sup>12</sup>	25 <sup>0</sup> 0 <sup>6</sup>
21	10 <sup>89</sup> 0 <sup>13</sup>	15 <sup>2</sup> 0 <sup>7</sup>	30 <sup>51</sup> 0 <sup>13</sup>	31 <sup>3</sup> 0 <sup>3</sup>	30 <sup>86</sup> 0 <sup>14</sup>	24 <sup>3</sup> 0 <sup>7</sup>
31	10 <sup>77</sup> 0 <sup>12</sup>	14 <sup>5</sup> 0 <sup>7</sup>	30 <sup>38</sup> 0 <sup>13</sup>	31 <sup>6</sup> 0 <sup>1</sup>	30 <sup>72</sup> 0 <sup>14</sup>	23 <sup>5</sup> 0 <sup>8</sup>
Feb. 10	10 <sup>66</sup> 0 <sup>11</sup>	13 <sup>8</sup> 0 <sup>7</sup>	30 <sup>26</sup> 0 <sup>12</sup>	31 <sup>7</sup> 0 <sup>1</sup>	30 <sup>59</sup> 0 <sup>13</sup>	22 <sup>7</sup> 0 <sup>8</sup>
20	10 <sup>56</sup> 0 <sup>10</sup>	13 <sup>2</sup> 0 <sup>6</sup>	30 <sup>15</sup> 0 <sup>11</sup>	31 <sup>7</sup> 0 <sup>0</sup>	30 <sup>47</sup> 0 <sup>12</sup>	21 <sup>9</sup> 0 <sup>8</sup>
Mar. 2	10 <sup>48</sup> 0 <sup>08</sup>	12 <sup>7</sup> 0 <sup>5</sup>	30 <sup>05</sup> 0 <sup>10</sup>	31 <sup>4</sup> 0 <sup>3</sup>	30 <sup>36</sup> 0 <sup>11</sup>	21 <sup>2</sup> 0 <sup>7</sup>
12	10 <sup>43</sup> 0 <sup>05</sup>	12 <sup>4</sup> 0 <sup>3</sup>	29 <sup>98</sup> 0 <sup>07</sup>	30 <sup>8</sup> 0 <sup>6</sup>	30 <sup>28</sup> 0 <sup>08</sup>	20 <sup>5</sup> 0 <sup>7</sup>
22	10 <sup>42</sup> 0 <sup>01</sup>	12 <sup>3</sup> 0 <sup>1</sup>	29 <sup>95</sup> 0 <sup>03</sup>	30 <sup>0</sup> 0 <sup>8</sup>	30 <sup>24</sup> 0 <sup>04</sup>	20 <sup>0</sup> 0 <sup>5</sup>
Apr. 1	10 <sup>44</sup> 0 <sup>02</sup>	12 <sup>4</sup> 0 <sup>1</sup>	29 <sup>95</sup> 0 <sup>00</sup>	29 <sup>0</sup> 1 <sup>0</sup>	30 <sup>24</sup> 0 <sup>00</sup>	19 <sup>6</sup> 0 <sup>4</sup>
11	10 <sup>51</sup> 0 <sup>07</sup>	12 <sup>7</sup> 0 <sup>3</sup>	29 <sup>99</sup> 0 <sup>04</sup>	27 <sup>6</sup> 1 <sup>4</sup>	30 <sup>28</sup> 0 <sup>04</sup>	19 <sup>5</sup> 0 <sup>1</sup>
21	10 <sup>62</sup> 0 <sup>11</sup>	13 <sup>3</sup> 0 <sup>6</sup>	30 <sup>08</sup> 0 <sup>09</sup>	26 <sup>1</sup> 1 <sup>5</sup>	30 <sup>36</sup> 0 <sup>08</sup>	19 <sup>6</sup> 0 <sup>1</sup>
May 1	10 <sup>77</sup> 0 <sup>15</sup>	14 <sup>2</sup> 0 <sup>9</sup>	30 <sup>21</sup> 0 <sup>13</sup>	24 <sup>4</sup> 1 <sup>7</sup>	30 <sup>49</sup> 0 <sup>13</sup>	20 <sup>0</sup> 0 <sup>4</sup>
11	10 <sup>97</sup> 0 <sup>20</sup>	15 <sup>3</sup> 1 <sup>1</sup>	30 <sup>38</sup> 0 <sup>17</sup>	22 <sup>5</sup> 1 <sup>9</sup>	30 <sup>67</sup> 0 <sup>18</sup>	20 <sup>6</sup> 0 <sup>6</sup>
21	11 <sup>20</sup> 0 <sup>23</sup>	16 <sup>7</sup> 1 <sup>4</sup>	30 <sup>59</sup> 0 <sup>21</sup>	20 <sup>4</sup> 2 <sup>1</sup>	30 <sup>88</sup> 0 <sup>21</sup>	21 <sup>6</sup> 1 <sup>0</sup>
31	11 <sup>46</sup> 0 <sup>26</sup>	18 <sup>3</sup> 1 <sup>6</sup>	30 <sup>84</sup> 0 <sup>25</sup>	18 <sup>3</sup> 2 <sup>1</sup>	31 <sup>13</sup> 0 <sup>25</sup>	22 <sup>8</sup> 1 <sup>2</sup>
June 10	11 <sup>75</sup> 0 <sup>29</sup>	20 <sup>0</sup> 1 <sup>7</sup>	31 <sup>11</sup> 0 <sup>27</sup>	16 <sup>1</sup> 2 <sup>2</sup>	31 <sup>41</sup> 0 <sup>28</sup>	24 <sup>2</sup> 1 <sup>4</sup>
20	12 <sup>05</sup> 0 <sup>30</sup>	21 <sup>9</sup> 1 <sup>9</sup>	31 <sup>40</sup> 0 <sup>29</sup>	13 <sup>9</sup> 2 <sup>2</sup>	31 <sup>72</sup> 0 <sup>31</sup>	25 <sup>8</sup> 1 <sup>6</sup>
30	12 <sup>37</sup> 0 <sup>32</sup>	23 <sup>9</sup> 2 <sup>0</sup>	31 <sup>71</sup> 0 <sup>31</sup>	11 <sup>7</sup> 2 <sup>2</sup>	32 <sup>03</sup> 0 <sup>31</sup>	27 <sup>5</sup> 1 <sup>7</sup>
July 10	12 <sup>68</sup> 0 <sup>31</sup>	25 <sup>9</sup> 2 <sup>0</sup>	32 <sup>02</sup> 0 <sup>31</sup>	9 <sup>7</sup> 2 <sup>0</sup>	32 <sup>35</sup> 0 <sup>32</sup>	29 <sup>4</sup> 1 <sup>9</sup>
20	12 <sup>98</sup> 0 <sup>30</sup>	27 <sup>8</sup> 1 <sup>9</sup>	32 <sup>33</sup> 0 <sup>31</sup>	7 <sup>9</sup> 1 <sup>8</sup>	32 <sup>67</sup> 0 <sup>32</sup>	31 <sup>3</sup> 1 <sup>9</sup>
30	13 <sup>27</sup> 0 <sup>29</sup>	29 <sup>7</sup> 1 <sup>9</sup>	32 <sup>63</sup> 0 <sup>30</sup>	6 <sup>3</sup> 1 <sup>6</sup>	32 <sup>97</sup> 0 <sup>30</sup>	33 <sup>3</sup> 2 <sup>0</sup>
Aug. 9	13 <sup>54</sup> 0 <sup>27</sup>	31 <sup>5</sup> 1 <sup>8</sup>	32 <sup>91</sup> 0 <sup>28</sup>	4 <sup>9</sup> 1 <sup>4</sup>	33 <sup>26</sup> 0 <sup>29</sup>	35 <sup>2</sup> 1 <sup>9</sup>
19	13 <sup>79</sup> 0 <sup>25</sup>	33 <sup>2</sup> 1 <sup>7</sup>	33 <sup>17</sup> 0 <sup>26</sup>	3 <sup>8</sup> 1 <sup>1</sup>	33 <sup>52</sup> 0 <sup>26</sup>	37 <sup>0</sup> 1 <sup>8</sup>
29	14 <sup>00</sup> 0 <sup>21</sup>	34 <sup>6</sup> 1 <sup>4</sup>	33 <sup>40</sup> 0 <sup>23</sup>	3 <sup>1</sup> 0 <sup>7</sup>	33 <sup>76</sup> 0 <sup>24</sup>	38 <sup>7</sup> 1 <sup>7</sup>
Sept. 8	14 <sup>18</sup> 0 <sup>18</sup>	35 <sup>9</sup> 1 <sup>3</sup>	33 <sup>60</sup> 0 <sup>20</sup>	2 <sup>6</sup> 0 <sup>5</sup>	33 <sup>97</sup> 0 <sup>21</sup>	40 <sup>2</sup> 1 <sup>5</sup>
18	14 <sup>33</sup> 0 <sup>15</sup>	36 <sup>9</sup> 1 <sup>0</sup>	33 <sup>77</sup> 0 <sup>17</sup>	2 <sup>5</sup> 0 <sup>1</sup>	34 <sup>14</sup> 0 <sup>17</sup>	41 <sup>6</sup> 1 <sup>4</sup>
28	14 <sup>44</sup> 0 <sup>11</sup>	37 <sup>6</sup> 0 <sup>7</sup>	33 <sup>90</sup> 0 <sup>13</sup>	2 <sup>7</sup> 0 <sup>2</sup>	34 <sup>28</sup> 0 <sup>14</sup>	42 <sup>8</sup> 1 <sup>2</sup>
Oct. 8	14 <sup>51</sup> 0 <sup>07</sup>	38 <sup>2</sup> 0 <sup>6</sup>	33 <sup>99</sup> 0 <sup>09</sup>	3 <sup>1</sup> 0 <sup>4</sup>	34 <sup>39</sup> 0 <sup>11</sup>	43 <sup>7</sup> 0 <sup>9</sup>
18	14 <sup>55</sup> 0 <sup>04</sup>	38 <sup>5</sup> 0 <sup>3</sup>	34 <sup>05</sup> 0 <sup>06</sup>	3 <sup>8</sup> 0 <sup>7</sup>	34 <sup>46</sup> 0 <sup>07</sup>	44 <sup>5</sup> 0 <sup>8</sup>
28	14 <sup>57</sup> 0 <sup>02</sup>	38 <sup>6</sup> 0 <sup>1</sup>	34 <sup>08</sup> 0 <sup>03</sup>	4 <sup>6</sup> 0 <sup>8</sup>	34 <sup>50</sup> 0 <sup>04</sup>	45 <sup>1</sup> 0 <sup>6</sup>
Nov. 7	14 <sup>55</sup> 0 <sup>04</sup>	38 <sup>6</sup> 0 <sup>0</sup>	34 <sup>08</sup> 0 <sup>00</sup>	5 <sup>6</sup> 1 <sup>0</sup>	34 <sup>52</sup> 0 <sup>02</sup>	45 <sup>5</sup> 0 <sup>4</sup>
17	14 <sup>51</sup> 0 <sup>06</sup>	38 <sup>4</sup> 0 <sup>2</sup>	34 <sup>06</sup> 0 <sup>02</sup>	6 <sup>6</sup> 1 <sup>0</sup>	34 <sup>50</sup> 0 <sup>02</sup>	45 <sup>7</sup> 0 <sup>2</sup>
27	14 <sup>45</sup> 0 <sup>08</sup>	38 <sup>0</sup> 0 <sup>4</sup>	34 <sup>01</sup> 0 <sup>05</sup>	7 <sup>7</sup> 1 <sup>1</sup>	34 <sup>46</sup> 0 <sup>04</sup>	45 <sup>7</sup> 0 <sup>0</sup>
Dec. 7	14 <sup>37</sup> 0 <sup>09</sup>	37 <sup>5</sup> 0 <sup>5</sup>	33 <sup>94</sup> 0 <sup>07</sup>	8 <sup>7</sup> 1 <sup>0</sup>	34 <sup>40</sup> 0 <sup>06</sup>	45 <sup>6</sup> 0 <sup>1</sup>
17	14 <sup>28</sup> 0 <sup>11</sup>	37 <sup>0</sup> 0 <sup>5</sup>	33 <sup>85</sup> 0 <sup>09</sup>	9 <sup>7</sup> 0 <sup>9</sup>	34 <sup>32</sup> 0 <sup>08</sup>	45 <sup>3</sup> 0 <sup>3</sup>
27	14 <sup>17</sup> 0 <sup>12</sup>	36 <sup>4</sup> 0 <sup>6</sup>	33 <sup>74</sup> 0 <sup>11</sup>	10 <sup>6</sup> 0 <sup>9</sup>	34 <sup>22</sup> 0 <sup>10</sup>	44 <sup>9</sup> 0 <sup>4</sup>
37	14 <sup>05</sup> 0 <sup>12</sup>	35 <sup>8</sup> 0 <sup>6</sup>	33 <sup>62</sup> 0 <sup>12</sup>	11 <sup>4</sup> 0 <sup>8</sup>	34 <sup>10</sup> 0 <sup>12</sup>	44 <sup>4</sup> 0 <sup>5</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Eridani (Achernar)		$\gamma$ Piscium.		$\beta$ Arietis.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> I 32	<sup>°</sup> 57 53	<sup>h</sup> I 34	<sup>°</sup> 4 49	<sup>h</sup> I 47	<sup>°</sup> 20 10
Jan. 1	51° 47' 0" 33	76° 5' 0" 3	39° 44' 0" 12	36° 2' 0" 6	27° 23' 0" 13	15° 0' 0" 4
11	51° 14' 0" 33	76° 8' 0" 3	39° 32' 0" 12	35° 6' 0" 7	27° 10' 0" 14	14° 6' 0" 6
21	50° 81' 0" 32	76° 6' 0" 8	39° 20' 0" 14	34° 9' 0" 6	26° 96' 0" 15	14° 0' 0" 7
31	50° 49' 0" 31	75° 8' 0" 8	39° 06' 0" 13	34° 3' 0" 5	26° 81' 0" 15	13° 3' 0" 8
Feb. 10	50° 18' 0" 28	74° 4' 0" 8	38° 93' 0" 12	33° 8' 0" 4	26° 66' 0" 14	12° 5' 0" 8
20	49° 90' 0" 25	72° 6' 0" 3	38° 81' 0" 11	33° 4' 0" 3	26° 52' 0" 13	11° 7' 0" 9
Mar. 2	49° 65' 0" 20	70° 3' 0" 3	38° 70' 0" 09	33° 1' 0" 2	26° 39' 0" 10	10° 8' 0" 9
12	49° 45' 0" 14	67° 6' 0" 3	38° 61' 0" 05	32° 9' 0" 0	26° 29' 0" 07	9° 9' 0" 8
Apr. 22	49° 31' 0" 09	64° 6' 0" 3	38° 56' 0" 01	32° 9' 0" 2	26° 22' 0" 03	9° 1' 0" 6
1	49° 22' 0" 02	61° 3' 0" 3	38° 55' 0" 02	33° 1' 0" 5	26° 19' 0" 01	8° 5' 0" 5
11	49° 20' 0" 06	57° 9' 0" 3	38° 57' 0" 08	33° 6' 0" 7	26° 20' 0" 07	8° 0' 0" 3
21	49° 26' 0" 12	54° 0' 0" 3	38° 65' 0" 11	34° 3' 0" 1	26° 27' 0" 11	7° 7' 0" 0
May 1	49° 38' 0" 20	50° 3' 0" 5	38° 76' 0" 16	35° 3' 0" 2	26° 38' 0" 16	7° 7' 0" 3
11	49° 58' 0" 26	46° 8' 0" 5	38° 92' 0" 20	36° 5' 0" 4	26° 54' 0" 20	8° 0' 0" 6
21	49° 84' 0" 33	43° 3' 0" 5	39° 12' 0" 24	37° 9' 0" 6	26° 74' 0" 24	8° 6' 0" 8
31	50° 17' 0" 38	40° 0' 0" 3	39° 36' 0" 27	39° 5' 0" 7	26° 98' 0" 28	9° 4' 0" 1
June 10	50° 55' 0" 42	37° 0' 0" 6	39° 63' 0" 29	41° 2' 0" 9	27° 26' 0" 30	10° 5' 0" 3
20	50° 97' 0" 46	34° 4' 0" 2	39° 92' 0" 30	43° 1' 0" 9	27° 56' 0" 32	11° 8' 0" 5
30	51° 43' 0" 48	32° 2' 0" 8	40° 22' 0" 31	45° 0' 0" 9	27° 88' 0" 32	13° 3' 0" 7
July 10	51° 91' 0" 49	30° 4' 0" 2	40° 53' 0" 31	46° 9' 0" 9	28° 20' 0" 33	15° 0' 0" 8
20	52° 40' 0" 48	29° 2' 0" 7	40° 84' 0" 30	48° 8' 0" 9	28° 53' 0" 32	16° 8' 0" 9
30	52° 88' 0" 47	28° 5' 0" 1	41° 14' 0" 29	50° 7' 0" 7	28° 85' 0" 30	18° 7' 0" 9
Aug. 9	53° 35' 0" 44	28° 4' 0" 5	41° 43' 0" 26	52° 4' 0" 5	29° 15' 0" 28	20° 6' 0" 8
19	53° 79' 0" 39	28° 9' 0" 1	41° 69' 0" 24	53° 9' 0" 3	29° 43' 0" 26	22° 4' 0" 8
29	54° 18' 0" 34	29° 9' 0" 5	41° 93' 0" 21	55° 2' 0" 1	29° 69' 0" 23	24° 2' 0" 7
Sept. 8	54° 52' 0" 28	31° 4' 0" 0	42° 14' 0" 18	56° 3' 0" 9	29° 92' 0" 20	25° 9' 0" 6
18	54° 80' 0" 22	33° 4' 0" 4	42° 32' 0" 15	57° 2' 0" 6	30° 12' 0" 17	27° 5' 0" 4
28	55° 02' 0" 14	35° 8' 0" 7	42° 47' 0" 11	57° 8' 0" 3	30° 29' 0" 13	28° 9' 0" 3
Oct. 8	55° 16' 0" 07	38° 5' 0" 8	42° 58' 0" 09	58° 1' 0" 1	30° 42' 0" 10	30° 2' 0" 0
18	55° 23' 0" 01	41° 3' 0" 9	42° 67' 0" 05	58° 2' 0" 0	30° 52' 0" 07	31° 2' 0" 9
28	55° 24' 0" 07	44° 2' 0" 9	42° 72' 0" 02	58° 2' 0" 2	30° 59' 0" 04	32° 1' 0" 7
Nov. 7	55° 17' 0" 12	47° 1' 0" 8	42° 74' 0" 01	58° 0' 0" 3	30° 63' 0" 01	32° 8' 0" 5
17	55° 05' 0" 18	49° 9' 0" 4	42° 73' 0" 03	57° 7' 0" 5	30° 64' 0" 02	33° 3' 0" 4
27	54° 87' 0" 23	52° 3' 0" 1	42° 70' 0" 05	57° 2' 0" 5	30° 62' 0" 05	33° 7' 0" 1
Dec. 7	54° 64' 0" 27	54° 4' 0" 7	42° 65' 0" 08	56° 7' 0" 6	30° 57' 0" 07	33° 8' 0" 0
17	54° 37' 0" 30	56° 1' 0" 1	42° 57' 0" 09	56° 1' 0" 7	30° 50' 0" 10	33° 8' 0" 1
27	54° 07' 0" 31	57° 2' 0" 6	42° 48' 0" 11	55° 4' 0" 6	30° 40' 0" 12	33° 7' 0" 4
37	53° 76' 0" 31	57° 8' 0" 6	42° 37' 0" 11	54° 8' 0" 6	30° 28' 0" 12	33° 3' 0" 4



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Arietis.		67 Ceti.		$\xi$ Ceti.	
	R. A.	Dec. North.	R. A.	Dec. South.	R. A.	Dec. North.
	<sup>h</sup> I <sup>m</sup> 59	<sup>°</sup> 22 <sup>'</sup> 50	<sup>h</sup> 2 <sup>m</sup> 10	<sup>°</sup> 7 <sup>'</sup> 1	<sup>h</sup> 2 <sup>m</sup> 21	<sup>°</sup> 7 <sup>'</sup> 52
Jan. 1	50° 56' 0.13	45° 3' 0.3	29° 55' 0.12	32° 9' 0.8	14° 62' 0.11	26° 0' 0.5
11	50° 43' 0.14	45° 0' 0.5	29° 43' 0.13	33° 7' 0.7	14° 51' 0.13	25° 5' 0.6
21	50° 29' 0.16	44° 5' 0.6	29° 30' 0.15	34° 4' 0.5	14° 38' 0.14	24° 9' 0.6
31	50° 13' 0.16	43° 9' 0.8	29° 15' 0.14	34° 9' 0.3	14° 24' 0.15	24° 3' 0.5
Feb. 10	49° 97' 0.15	43° 1' 0.9	29° 01' 0.14	35° 2' 0.0	14° 09' 0.14	23° 8' 0.4
20	49° 82' 0.13	42° 2' 0.9	28° 87' 0.13	35° 2' 0.1	13° 95' 0.14	23° 4' 0.4
Mar. 2	49° 69' 0.12	41° 3' 0.9	28° 74' 0.11	35° 1' 0.4	13° 81' 0.12	23° 0' 0.3
12	49° 57' 0.08	40° 4' 0.9	28° 63' 0.09	34° 7' 0.6	13° 69' 0.09	22° 7' 0.1
22	49° 49' 0.04	39° 5' 0.8	28° 54' 0.05	34° 1' 0.9	13° 60' 0.06	22° 6' 0.1
Apr. 1	49° 45' 0.00	38° 7' 0.6	28° 49' 0.01	33° 2' 1.1	13° 54' 0.02	22° 7' 0.2
11	49° 45' 0.04	38° 1' 0.5	28° 48' 0.03	32° 1' 1.3	13° 52' 0.03	22° 9' 0.4
21	49° 49' 0.11	37° 6' 0.2	28° 51' 0.08	30° 8' 1.7	13° 55' 0.07	23° 3' 0.8
May 1	49° 60' 0.15	37° 4' 0.1	28° 59' 0.12	29° 1' 1.8	13° 62' 0.12	24° 1' 0.9
11	49° 75' 0.20	37° 5' 0.4	28° 71' 0.17	27° 3' 1.9	13° 74' 0.16	25° 0' 1.2
21	49° 95' 0.24	37° 9' 0.6	28° 88' 0.20	25° 4' 2.1	13° 90' 0.21	26° 2' 1.3
31	50° 19' 0.27	38° 5' 0.9	29° 08' 0.24	23° 3' 2.1	14° 11' 0.24	27° 5' 1.5
June 10	50° 46' 0.30	39° 4' 1.2	29° 32' 0.27	21° 2' 2.2	14° 35' 0.27	29° 0' 1.6
20	50° 76' 0.31	40° 6' 1.4	29° 59' 0.29	19° 0' 2.2	14° 62' 0.29	30° 6' 1.8
30	51° 07' 0.33	42° 0' 1.5	29° 88' 0.30	16° 8' 2.1	14° 91' 0.30	32° 4' 1.8
July 10	51° 40' 0.33	43° 5' 1.7	30° 18' 0.31	14° 7' 1.9	15° 21' 0.31	34° 2' 1.8
20	51° 73' 0.33	45° 2' 1.8	30° 49' 0.30	12° 8' 1.7	15° 52' 0.31	36° 0' 1.7
30	52° 06' 0.31	47° 0' 1.9	30° 79' 0.30	11° 1' 1.6	15° 83' 0.30	37° 7' 1.7
Aug. 9	52° 37' 0.29	48° 9' 1.8	31° 09' 0.28	9° 5' 1.3	16° 13' 0.28	39° 4' 1.5
19	52° 66' 0.27	50° 7' 1.9	31° 37' 0.26	8° 2' 0.9	16° 41' 0.27	40° 9' 1.4
29	52° 93' 0.25	52° 6' 1.7	31° 63' 0.24	7° 3' 0.5	16° 68' 0.25	42° 3' 1.1
Sept. 8	53° 18' 0.21	54° 3' 1.6	31° 87' 0.20	6° 8' 0.2	16° 93' 0.21	43° 4' 1.0
18	53° 39' 0.18	55° 9' 1.5	32° 07' 0.18	6° 6' 0.0	17° 14' 0.19	44° 4' 0.7
28	53° 57' 0.15	57° 4' 1.4	32° 25' 0.15	6° 6' 0.3	17° 33' 0.16	45° 1' 0.5
Oct. 8	53° 72' 0.12	58° 8' 1.2	32° 40' 0.12	6° 9' 0.6	17° 49' 0.13	45° 6' 0.2
18	53° 84' 0.09	60° 0' 1.0	32° 52' 0.08	7° 5' 0.8	17° 62' 0.10	45° 8' 0.1
28	53° 93' 0.05	61° 9' 0.9	32° 60' 0.05	8° 3' 1.0	17° 72' 0.07	45° 9' 0.1
Nov. 7	53° 98' 0.02	61° 9' 0.7	32° 65' 0.02	9° 3' 1.1	17° 79' 0.04	45° 8' 0.2
17	54° 00' 0.01	62° 6' 0.5	32° 67' 0.00	10° 4' 1.1	17° 83' 0.02	45° 6' 0.3
27	53° 99' 0.04	63° 1' 0.3	32° 67' 0.03	11° 5' 1.1	17° 85' 0.02	45° 3' 0.5
Dec. 7	53° 95' 0.07	63° 4' 0.1	32° 64' 0.06	12° 6' 1.1	17° 83' 0.05	44° 8' 0.5
17	53° 88' 0.09	63° 5' 0.0	32° 58' 0.08	13° 7' 1.0	17° 78' 0.07	44° 3' 0.5
27	53° 79' 0.12	63° 5' 0.2	32° 50' 0.11	14° 7' 0.9	17° 71' 0.09	43° 8' 0.5
37	53° 67' 0.12	63° 3' 0.2	32° 39' 0.11	15° 6' 0.9	17° 62' 0.09	43° 3' 0.5



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\gamma$ Ceti.		$\alpha$ Ceti.		$\delta$ Arietis.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 2 <sup>m</sup> 36	<sup>°</sup> 2 <sup>'</sup> 40	<sup>h</sup> 2 <sup>m</sup> 55	<sup>°</sup> 3 <sup>'</sup> 34	<sup>h</sup> 3 <sup>m</sup> 4	<sup>°</sup> 19 <sup>'</sup> 13
Jan. 1	33° 68' 0" 11	61° 5' 0" 7	28° 00' 0" 10	31° 8' 0" 6	11° 83' 0" 09	56° 0' 0" 2
11	33° 57' 0" 12	60° 8' 0" 6	28° 80' 0" 12	31° 2' 0" 7	11° 74' 0" 13	55° 8' 0" 3
21	33° 45' 0" 14	60° 2' 0" 6	28° 68' 0" 14	30° 5' 0" 5	11° 61' 0" 15	55° 5' 0" 3
31	33° 31' 0" 15	59° 6' 0" 4	28° 54' 0" 15	30° 0' 0" 4	11° 46' 0" 16	55° 2' 0" 5
Feb. 10	33° 16' 0" 15	59° 2' 0" 3	28° 39' 0" 16	29° 6' 0" 4	11° 30' 0" 17	54° 7' 0" 5
20	33° 01' 0" 15	58° 9' 0" 2	28° 23' 0" 15	29° 2' 0" 2	11° 13' 0" 16	54° 2' 0" 5
Mar. 2	32° 86' 0" 13	58° 7' 0" 1	28° 08' 0" 14	29° 0' 0" 1	10° 97' 0" 15	53° 7' 0" 6
12	32° 73' 0" 10	58° 6' 0" 1	27° 94' 0" 11	28° 9' 0" 1	10° 82' 0" 13	53° 1' 0" 5
22	32° 63' 0" 07	58° 7' 0" 4	27° 83' 0" 09	29° 0' 0" 3	10° 69' 0" 10	52° 6' 0" 4
Apr. 1	32° 56' 0" 03	59° 1' 0" 5	27° 74' 0" 05	29° 3' 0" 4	10° 59' 0" 06	52° 2' 0" 4
11	32° 53' 0" 00	59° 6' 0" 7	27° 69' 0" 01	29° 7' 0" 7	10° 53' 0" 02	51° 8' 0" 2
21	32° 53' 0" 05	60° 3' 0" 7	27° 68' 0" 03	30° 4' 0" 9	10° 51' 0" 03	51° 6' 0" 0
May 1	32° 49' 0" 10	60° 1' 0" 2	27° 71' 0" 09	31° 3' 0" 2	10° 54' 0" 09	51° 6' 0" 1
11	32° 69' 0" 14	62° 6' 0" 1	27° 80' 0" 13	32° 5' 0" 2	10° 63' 0" 14	51° 7' 0" 3
21	32° 83' 0" 19	63° 9' 0" 1	27° 93' 0" 17	33° 7' 0" 5	10° 77' 0" 18	52° 0' 0" 6
31	33° 02' 0" 23	65° 5' 0" 7	28° 10' 0" 21	35° 2' 0" 6	10° 95' 0" 22	52° 6' 0" 8
June 10	33° 25' 0" 25	67° 2' 0" 8	28° 31' 0" 25	36° 8' 0" 8	11° 17' 0" 25	53° 4' 0" 1
20	33° 50' 0" 28	69° 0' 0" 9	28° 56' 0" 27	38° 6' 0" 8	11° 42' 0" 28	54° 4' 0" 1
30	33° 78' 0" 30	70° 9' 0" 8	28° 83' 0" 28	40° 4' 0" 8	11° 70' 0" 30	55° 5' 0" 3
July 10	34° 08' 0" 30	72° 7' 0" 8	29° 11' 0" 30	42° 2' 0" 8	12° 00' 0" 31	56° 8' 0" 4
20	34° 38' 0" 31	74° 5' 0" 8	29° 41' 0" 31	44° 0' 0" 7	12° 31' 0" 32	58° 2' 0" 5
30	34° 69' 0" 30	76° 3' 0" 6	29° 72' 0" 30	45° 7' 0" 5	12° 63' 0" 32	59° 7' 0" 5
Aug. 9	34° 99' 0" 28	77° 9' 0" 4	30° 02' 0" 29	47° 2' 0" 4	12° 95' 0" 31	61° 2' 0" 5
19	35° 27' 0" 27	79° 3' 0" 2	30° 31' 0" 28	48° 6' 0" 2	13° 26' 0" 30	62° 7' 0" 4
29	35° 54' 0" 25	80° 5' 0" 9	30° 59' 0" 26	49° 8' 0" 1	13° 56' 0" 28	64° 1' 0" 3
Sept. 8	35° 79' 0" 23	81° 4' 0" 7	30° 85' 0" 24	50° 8' 0" 7	13° 84' 0" 26	65° 4' 0" 2
18	36° 02' 0" 20	82° 1' 0" 5	31° 09' 0" 22	51° 5' 0" 4	14° 10' 0" 23	66° 6' 0" 1
28	36° 22' 0" 17	82° 6' 0" 2	31° 31' 0" 19	51° 9' 0" 2	14° 33' 0" 21	67° 7' 0" 1
Oct. 8	36° 39' 0" 15	82° 8' 0" 1	31° 50' 0" 16	52° 1' 0" 0	14° 54' 0" 19	68° 7' 0" 8
18	36° 54' 0" 11	82° 7' 0" 3	31° 66' 0" 13	52° 1' 0" 2	14° 73' 0" 15	69° 5' 0" 7
28	36° 65' 0" 08	82° 4' 0" 4	31° 79' 0" 11	51° 9' 0" 4	14° 88' 0" 12	70° 2' 0" 5
Nov. 7	36° 73' 0" 05	82° 0' 0" 6	31° 90' 0" 07	51° 5' 0" 6	15° 00' 0" 09	70° 7' 0" 4
17	36° 78' 0" 02	81° 4' 0" 6	31° 97' 0" 04	50° 9' 0" 7	15° 09' 0" 06	71° 1' 0" 3
27	36° 80' 0" 00	80° 8' 0" 8	32° 01' 0" 01	50° 2' 0" 7	15° 15' 0" 02	71° 4' 0" 2
Dec. 7	36° 80' 0" 03	80° 0' 0" 7	32° 02' 0" 02	49° 5' 0" 7	15° 17' 0" 01	71° 6' 0" 0
17	36° 77' 0" 07	79° 3' 0" 7	32° 00' 0" 05	48° 8' 0" 7	15° 16' 0" 04	71° 6' 0" 0
27	36° 70' 0" 09	78° 6' 0" 7	31° 95' 0" 09	48° 1' 0" 7	15° 12' 0" 08	71° 6' 0" 1
37	36° 61' 0" 09	77° 9' 0" 7	31° 86' 0" 09	47° 4' 0" 7	15° 04' 0" 08	71° 5' 0" 1



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Persei.			$\eta$ Tauri.			$\gamma$ Eridani.		
	R. A.	Dec. North.		R. A.	Dec. North.		R. A.	Dec. South.	
	h m	° '		h m	° '		h m	° '	
	3 15	49 23		3 39	23 41		3 51	13 52	
Jan. 1	3 <sup>s</sup> .50 <sup>s</sup>	48 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .0 <sup>s</sup>	45 <sup>s</sup> .64 <sup>s</sup>	60 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .08 <sup>s</sup>	57 <sup>s</sup> .98 <sup>s</sup>	61 <sup>s</sup> .0 <sup>s</sup>	1 <sup>s</sup> .4 <sup>s</sup>
11	3 <sup>s</sup> .34 <sup>s</sup>	49 <sup>s</sup> .4 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>	45 <sup>s</sup> .56 <sup>s</sup>	60 <sup>s</sup> .3 <sup>s</sup>	0 <sup>s</sup> .1 <sup>s</sup>	57 <sup>s</sup> .90 <sup>s</sup>	62 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>
21	3 <sup>s</sup> .14 <sup>s</sup>	50 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .3 <sup>s</sup>	45 <sup>s</sup> .45 <sup>s</sup>	60 <sup>s</sup> .3 <sup>s</sup>	0 <sup>s</sup> .0 <sup>s</sup>	57 <sup>s</sup> .79 <sup>s</sup>	63 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>
31	2 <sup>s</sup> .90 <sup>s</sup>	50 <sup>s</sup> .3 <sup>s</sup>	0 <sup>s</sup> .1 <sup>s</sup>	45 <sup>s</sup> .31 <sup>s</sup>	60 <sup>s</sup> .1 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	57 <sup>s</sup> .64 <sup>s</sup>	64 <sup>s</sup> .4 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>
		0 <sup>s</sup> .26 <sup>s</sup>			0 <sup>s</sup> .17 <sup>s</sup>			0 <sup>s</sup> .16 <sup>s</sup>	
Feb. 10	2 <sup>s</sup> .64 <sup>s</sup>	50 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	45 <sup>s</sup> .14 <sup>s</sup>	59 <sup>s</sup> .9 <sup>s</sup>	0 <sup>s</sup> .4 <sup>s</sup>	57 <sup>s</sup> .48 <sup>s</sup>	65 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>
20	2 <sup>s</sup> .37 <sup>s</sup>	49 <sup>s</sup> .7 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>	44 <sup>s</sup> .96 <sup>s</sup>	59 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .4 <sup>s</sup>	57 <sup>s</sup> .31 <sup>s</sup>	65 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .0 <sup>s</sup>
Mar. 2	2 <sup>s</sup> .10 <sup>s</sup>	48 <sup>s</sup> .8 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>	44 <sup>s</sup> .78 <sup>s</sup>	59 <sup>s</sup> .1 <sup>s</sup>	0 <sup>s</sup> .4 <sup>s</sup>	57 <sup>s</sup> .13 <sup>s</sup>	65 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .3 <sup>s</sup>
12	1 <sup>s</sup> .85 <sup>s</sup>	47 <sup>s</sup> .7 <sup>s</sup>	1 <sup>s</sup> .4 <sup>s</sup>	44 <sup>s</sup> .60 <sup>s</sup>	58 <sup>s</sup> .6 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	56 <sup>s</sup> .95 <sup>s</sup>	64 <sup>s</sup> .9 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>
		0 <sup>s</sup> .21 <sup>s</sup>			0 <sup>s</sup> .15 <sup>s</sup>			0 <sup>s</sup> .16 <sup>s</sup>	
Apr. 22	1 <sup>s</sup> .64 <sup>s</sup>	46 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .6 <sup>s</sup>	44 <sup>s</sup> .45 <sup>s</sup>	58 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	56 <sup>s</sup> .79 <sup>s</sup>	64 <sup>s</sup> .3 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>
1	1 <sup>s</sup> .47 <sup>s</sup>	44 <sup>s</sup> .7 <sup>s</sup>	1 <sup>s</sup> .8 <sup>s</sup>	44 <sup>s</sup> .32 <sup>s</sup>	57 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	56 <sup>s</sup> .65 <sup>s</sup>	63 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>
11	1 <sup>s</sup> .35 <sup>s</sup>	42 <sup>s</sup> .9 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>	44 <sup>s</sup> .22 <sup>s</sup>	57 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	56 <sup>s</sup> .54 <sup>s</sup>	62 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .5 <sup>s</sup>
21	1 <sup>s</sup> .30 <sup>s</sup>	41 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>	44 <sup>s</sup> .17 <sup>s</sup>	56 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	56 <sup>s</sup> .47 <sup>s</sup>	60 <sup>s</sup> .8 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>
		0 <sup>s</sup> .02 <sup>s</sup>			0 <sup>s</sup> .00 <sup>s</sup>			0 <sup>s</sup> .03 <sup>s</sup>	
May 1	1 <sup>s</sup> .32 <sup>s</sup>	39 <sup>s</sup> .5 <sup>s</sup>	1 <sup>s</sup> .6 <sup>s</sup>	44 <sup>s</sup> .17 <sup>s</sup>	56 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	56 <sup>s</sup> .44 <sup>s</sup>	59 <sup>s</sup> .1 <sup>s</sup>	1 <sup>s</sup> .9 <sup>s</sup>
11	1 <sup>s</sup> .14 <sup>s</sup>	38 <sup>s</sup> .5 <sup>s</sup>	1 <sup>s</sup> .4 <sup>s</sup>	44 <sup>s</sup> .21 <sup>s</sup>	56 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	56 <sup>s</sup> .45 <sup>s</sup>	57 <sup>s</sup> .2 <sup>s</sup>	2 <sup>s</sup> .3 <sup>s</sup>
21	1 <sup>s</sup> .57 <sup>s</sup>	36 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .32 <sup>s</sup>	56 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .0 <sup>s</sup>	56 <sup>s</sup> .52 <sup>s</sup>	54 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .2 <sup>s</sup>
31	1 <sup>s</sup> .80 <sup>s</sup>	35 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .8 <sup>s</sup>	44 <sup>s</sup> .48 <sup>s</sup>	56 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	56 <sup>s</sup> .63 <sup>s</sup>	52 <sup>s</sup> .7 <sup>s</sup>	2 <sup>s</sup> .4 <sup>s</sup>
		0 <sup>s</sup> .28 <sup>s</sup>			0 <sup>s</sup> .19 <sup>s</sup>			0 <sup>s</sup> .16 <sup>s</sup>	
June 10	2 <sup>s</sup> .08 <sup>s</sup>	34 <sup>s</sup> .4 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>	44 <sup>s</sup> .67 <sup>s</sup>	56 <sup>s</sup> .6 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>	56 <sup>s</sup> .79 <sup>s</sup>	50 <sup>s</sup> .3 <sup>s</sup>	2 <sup>s</sup> .4 <sup>s</sup>
20	2 <sup>s</sup> .41 <sup>s</sup>	33 <sup>s</sup> .8 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .90 <sup>s</sup>	57 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>	56 <sup>s</sup> .98 <sup>s</sup>	47 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .3 <sup>s</sup>
30	2 <sup>s</sup> .78 <sup>s</sup>	33 <sup>s</sup> .6 <sup>s</sup>	0 <sup>s</sup> .1 <sup>s</sup>	45 <sup>s</sup> .17 <sup>s</sup>	57 <sup>s</sup> .9 <sup>s</sup>	0 <sup>s</sup> .7 <sup>s</sup>	57 <sup>s</sup> .21 <sup>s</sup>	45 <sup>s</sup> .6 <sup>s</sup>	2 <sup>s</sup> .3 <sup>s</sup>
July 10	3 <sup>s</sup> .18 <sup>s</sup>	33 <sup>s</sup> .7 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	45 <sup>s</sup> .46 <sup>s</sup>	58 <sup>s</sup> .8 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>	57 <sup>s</sup> .46 <sup>s</sup>	43 <sup>s</sup> .3 <sup>s</sup>	2 <sup>s</sup> .1 <sup>s</sup>
		0 <sup>s</sup> .42 <sup>s</sup>			0 <sup>s</sup> .31 <sup>s</sup>			0 <sup>s</sup> .27 <sup>s</sup>	
20	3 <sup>s</sup> .60 <sup>s</sup>	34 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .7 <sup>s</sup>	45 <sup>s</sup> .77 <sup>s</sup>	59 <sup>s</sup> .9 <sup>s</sup>	1 <sup>s</sup> .2 <sup>s</sup>	57 <sup>s</sup> .73 <sup>s</sup>	41 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .9 <sup>s</sup>
30	4 <sup>s</sup> .04 <sup>s</sup>	34 <sup>s</sup> .9 <sup>s</sup>	1 <sup>s</sup> .0 <sup>s</sup>	46 <sup>s</sup> .09 <sup>s</sup>	61 <sup>s</sup> .1 <sup>s</sup>	1 <sup>s</sup> .2 <sup>s</sup>	58 <sup>s</sup> .02 <sup>s</sup>	39 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>
Aug. 9	4 <sup>s</sup> .47 <sup>s</sup>	35 <sup>s</sup> .9 <sup>s</sup>	1 <sup>s</sup> .3 <sup>s</sup>	46 <sup>s</sup> .42 <sup>s</sup>	62 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .2 <sup>s</sup>	58 <sup>s</sup> .32 <sup>s</sup>	37 <sup>s</sup> .6 <sup>s</sup>	1 <sup>s</sup> .3 <sup>s</sup>
19	4 <sup>s</sup> .90 <sup>s</sup>	37 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .6 <sup>s</sup>	46 <sup>s</sup> .74 <sup>s</sup>	63 <sup>s</sup> .5 <sup>s</sup>	1 <sup>s</sup> .2 <sup>s</sup>	58 <sup>s</sup> .62 <sup>s</sup>	36 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .0 <sup>s</sup>
		0 <sup>s</sup> .41 <sup>s</sup>			0 <sup>s</sup> .32 <sup>s</sup>			0 <sup>s</sup> .29 <sup>s</sup>	
29	5 <sup>s</sup> .31 <sup>s</sup>	38 <sup>s</sup> .8 <sup>s</sup>	1 <sup>s</sup> .8 <sup>s</sup>	47 <sup>s</sup> .06 <sup>s</sup>	64 <sup>s</sup> .7 <sup>s</sup>	1 <sup>s</sup> .3 <sup>s</sup>	58 <sup>s</sup> .91 <sup>s</sup>	35 <sup>s</sup> .3 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>
Sept. 8	5 <sup>s</sup> .70 <sup>s</sup>	40 <sup>s</sup> .6 <sup>s</sup>	1 <sup>s</sup> .9 <sup>s</sup>	47 <sup>s</sup> .36 <sup>s</sup>	66 <sup>s</sup> .0 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>	59 <sup>s</sup> .19 <sup>s</sup>	34 <sup>s</sup> .7 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>
18	6 <sup>s</sup> .07 <sup>s</sup>	42 <sup>s</sup> .5 <sup>s</sup>	2 <sup>s</sup> .1 <sup>s</sup>	47 <sup>s</sup> .65 <sup>s</sup>	67 <sup>s</sup> .1 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>	59 <sup>s</sup> .46 <sup>s</sup>	34 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .3 <sup>s</sup>
28	6 <sup>s</sup> .41 <sup>s</sup>	44 <sup>s</sup> .6 <sup>s</sup>	2 <sup>s</sup> .1 <sup>s</sup>	47 <sup>s</sup> .92 <sup>s</sup>	68 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>	59 <sup>s</sup> .71 <sup>s</sup>	34 <sup>s</sup> .8 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>
		0 <sup>s</sup> .30 <sup>s</sup>			0 <sup>s</sup> .25 <sup>s</sup>			0 <sup>s</sup> .23 <sup>s</sup>	
Oct. 8	6 <sup>s</sup> .71 <sup>s</sup>	46 <sup>s</sup> .7 <sup>s</sup>	2 <sup>s</sup> .2 <sup>s</sup>	48 <sup>s</sup> .17 <sup>s</sup>	69 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>	59 <sup>s</sup> .94 <sup>s</sup>	35 <sup>s</sup> .4 <sup>s</sup>	0 <sup>s</sup> .9 <sup>s</sup>
18	6 <sup>s</sup> .98 <sup>s</sup>	48 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .2 <sup>s</sup>	48 <sup>s</sup> .39 <sup>s</sup>	70 <sup>s</sup> .1 <sup>s</sup>	0 <sup>s</sup> .7 <sup>s</sup>	60 <sup>s</sup> .15 <sup>s</sup>	36 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .3 <sup>s</sup>
28	7 <sup>s</sup> .20 <sup>s</sup>	51 <sup>s</sup> .1 <sup>s</sup>	2 <sup>s</sup> .2 <sup>s</sup>	48 <sup>s</sup> .58 <sup>s</sup>	70 <sup>s</sup> .8 <sup>s</sup>	0 <sup>s</sup> .7 <sup>s</sup>	60 <sup>s</sup> .33 <sup>s</sup>	37 <sup>s</sup> .6 <sup>s</sup>	1 <sup>s</sup> .5 <sup>s</sup>
Nov. 7	7 <sup>s</sup> .38 <sup>s</sup>	53 <sup>s</sup> .3 <sup>s</sup>	2 <sup>s</sup> .2 <sup>s</sup>	48 <sup>s</sup> .74 <sup>s</sup>	71 <sup>s</sup> .5 <sup>s</sup>	0 <sup>s</sup> .6 <sup>s</sup>	60 <sup>s</sup> .48 <sup>s</sup>	39 <sup>s</sup> .1 <sup>s</sup>	1 <sup>s</sup> .6 <sup>s</sup>
		0 <sup>s</sup> .13 <sup>s</sup>			0 <sup>s</sup> .13 <sup>s</sup>			0 <sup>s</sup> .12 <sup>s</sup>	
17	7 <sup>s</sup> .51 <sup>s</sup>	55 <sup>s</sup> .5 <sup>s</sup>	2 <sup>s</sup> .1 <sup>s</sup>	48 <sup>s</sup> .87 <sup>s</sup>	72 <sup>s</sup> .1 <sup>s</sup>	0 <sup>s</sup> .5 <sup>s</sup>	60 <sup>s</sup> .60 <sup>s</sup>	40 <sup>s</sup> .7 <sup>s</sup>	1 <sup>s</sup> .8 <sup>s</sup>
27	7 <sup>s</sup> .59 <sup>s</sup>	57 <sup>s</sup> .6 <sup>s</sup>	1 <sup>s</sup> .9 <sup>s</sup>	48 <sup>s</sup> .97 <sup>s</sup>	72 <sup>s</sup> .6 <sup>s</sup>	0 <sup>s</sup> .4 <sup>s</sup>	60 <sup>s</sup> .69 <sup>s</sup>	42 <sup>s</sup> .5 <sup>s</sup>	1 <sup>s</sup> .8 <sup>s</sup>
Dec. 7	7 <sup>s</sup> .62 <sup>s</sup>	59 <sup>s</sup> .5 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>	49 <sup>s</sup> .03 <sup>s</sup>	73 <sup>s</sup> .0 <sup>s</sup>	0 <sup>s</sup> .4 <sup>s</sup>	60 <sup>s</sup> .74 <sup>s</sup>	44 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .7 <sup>s</sup>
17	7 <sup>s</sup> .59 <sup>s</sup>	61 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .5 <sup>s</sup>	49 <sup>s</sup> .06 <sup>s</sup>	73 <sup>s</sup> .4 <sup>s</sup>	0 <sup>s</sup> .2 <sup>s</sup>	60 <sup>s</sup> .75 <sup>s</sup>	46 <sup>s</sup> .0 <sup>s</sup>	1 <sup>s</sup> .6 <sup>s</sup>
		0 <sup>s</sup> .08 <sup>s</sup>			0 <sup>s</sup> .02 <sup>s</sup>			0 <sup>s</sup> .03 <sup>s</sup>	
27	7 <sup>s</sup> .51 <sup>s</sup>	62 <sup>s</sup> .7 <sup>s</sup>	1 <sup>s</sup> .1 <sup>s</sup>	49 <sup>s</sup> .04 <sup>s</sup>	73 <sup>s</sup> .6 <sup>s</sup>	0 <sup>s</sup> .1 <sup>s</sup>	60 <sup>s</sup> .72 <sup>s</sup>	47 <sup>s</sup> .6 <sup>s</sup>	1 <sup>s</sup> .5 <sup>s</sup>
37	7 <sup>s</sup> .37 <sup>s</sup>	63 <sup>s</sup> .8 <sup>s</sup>		48 <sup>s</sup> .99 <sup>s</sup>	73 <sup>s</sup> .7 <sup>s</sup>		60 <sup>s</sup> .66 <sup>s</sup>	49 <sup>s</sup> .1 <sup>s</sup>	



APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	♋ Eridani.				♉ Tauri.				♉ Tauri. (Aldebaran)			
	R. A.		Dec. South.		R. A.		Dec. North.		R. A.		Dec. North.	
	h	m	°	'	h	m	°	'	h	m	°	'
	4	5	7	10	4	21	18	53	4	28	16	14
Jan. 1	31 <sup>h</sup> 40 <sup>m</sup>	0 <sup>s</sup> 07	52 <sup>°</sup> 3 <sup>'</sup>	1 <sup>2</sup>	1 <sup>h</sup> 84 <sup>m</sup>	0 <sup>s</sup> 05	18 <sup>°</sup> 1 <sup>'</sup>	0 <sup>1</sup>	28 <sup>h</sup> 01 <sup>m</sup>	0 <sup>s</sup> 04	38 <sup>°</sup> 9 <sup>'</sup>	0 <sup>2</sup>
11	31 <sup>h</sup> 33 <sup>m</sup>	0 <sup>s</sup> 09	53 <sup>°</sup> 5 <sup>'</sup>	1 <sup>0</sup>	1 <sup>h</sup> 79 <sup>m</sup>	0 <sup>s</sup> 08	18 <sup>°</sup> 0 <sup>'</sup>	0 <sup>1</sup>	27 <sup>h</sup> 97 <sup>m</sup>	0 <sup>s</sup> 08	38 <sup>°</sup> 7 <sup>'</sup>	0 <sup>2</sup>
21	31 <sup>h</sup> 24 <sup>m</sup>	0 <sup>s</sup> 13	54 <sup>°</sup> 5 <sup>'</sup>	0 <sup>8</sup>	1 <sup>h</sup> 71 <sup>m</sup>	0 <sup>s</sup> 12	17 <sup>°</sup> 9 <sup>'</sup>	0 <sup>1</sup>	27 <sup>h</sup> 89 <sup>m</sup>	0 <sup>s</sup> 11	38 <sup>°</sup> 5 <sup>'</sup>	0 <sup>2</sup>
31	31 <sup>h</sup> 11 <sup>m</sup>	0 <sup>s</sup> 15	55 <sup>°</sup> 3 <sup>'</sup>	0 <sup>6</sup>	1 <sup>h</sup> 59 <sup>m</sup>	0 <sup>s</sup> 15	17 <sup>°</sup> 8 <sup>'</sup>	0 <sup>2</sup>	27 <sup>h</sup> 78 <sup>m</sup>	0 <sup>s</sup> 14	38 <sup>°</sup> 3 <sup>'</sup>	0 <sup>2</sup>
Feb. 10	30 <sup>h</sup> 96 <sup>m</sup>	0 <sup>s</sup> 17	55 <sup>°</sup> 9 <sup>'</sup>	0 <sup>3</sup>	1 <sup>h</sup> 44 <sup>m</sup>	0 <sup>s</sup> 17	17 <sup>°</sup> 6 <sup>'</sup>	0 <sup>1</sup>	27 <sup>h</sup> 64 <sup>m</sup>	0 <sup>s</sup> 17	38 <sup>°</sup> 1 <sup>'</sup>	0 <sup>2</sup>
20	30 <sup>h</sup> 79 <sup>m</sup>	0 <sup>s</sup> 18	56 <sup>°</sup> 2 <sup>'</sup>	0 <sup>1</sup>	1 <sup>h</sup> 27 <sup>m</sup>	0 <sup>s</sup> 18	17 <sup>°</sup> 5 <sup>'</sup>	0 <sup>3</sup>	27 <sup>h</sup> 47 <sup>m</sup>	0 <sup>s</sup> 18	37 <sup>°</sup> 9 <sup>'</sup>	0 <sup>2</sup>
Mar. 2	30 <sup>h</sup> 61 <sup>m</sup>	0 <sup>s</sup> 17	56 <sup>°</sup> 3 <sup>'</sup>	0 <sup>1</sup>	1 <sup>h</sup> 09 <sup>m</sup>	0 <sup>s</sup> 18	17 <sup>°</sup> 2 <sup>'</sup>	0 <sup>2</sup>	27 <sup>h</sup> 29 <sup>m</sup>	0 <sup>s</sup> 18	37 <sup>°</sup> 7 <sup>'</sup>	0 <sup>2</sup>
12	30 <sup>h</sup> 44 <sup>m</sup>	0 <sup>s</sup> 16	56 <sup>°</sup> 2 <sup>'</sup>	0 <sup>3</sup>	0 <sup>h</sup> 91 <sup>m</sup>	0 <sup>s</sup> 18	17 <sup>°</sup> 0 <sup>'</sup>	0 <sup>3</sup>	27 <sup>h</sup> 11 <sup>m</sup>	0 <sup>s</sup> 17	37 <sup>°</sup> 5 <sup>'</sup>	0 <sup>2</sup>
22	30 <sup>h</sup> 28 <sup>m</sup>	0 <sup>s</sup> 14	55 <sup>°</sup> 9 <sup>'</sup>	0 <sup>7</sup>	0 <sup>h</sup> 73 <sup>m</sup>	0 <sup>s</sup> 15	16 <sup>°</sup> 7 <sup>'</sup>	0 <sup>3</sup>	26 <sup>h</sup> 94 <sup>m</sup>	0 <sup>s</sup> 15	37 <sup>°</sup> 3 <sup>'</sup>	0 <sup>2</sup>
Apr. 1	30 <sup>h</sup> 14 <sup>m</sup>	0 <sup>s</sup> 12	55 <sup>°</sup> 2 <sup>'</sup>	0 <sup>8</sup>	0 <sup>h</sup> 58 <sup>m</sup>	0 <sup>s</sup> 12	16 <sup>°</sup> 4 <sup>'</sup>	0 <sup>2</sup>	26 <sup>h</sup> 79 <sup>m</sup>	0 <sup>s</sup> 12	37 <sup>°</sup> 1 <sup>'</sup>	0 <sup>1</sup>
11	30 <sup>h</sup> 02 <sup>m</sup>	0 <sup>s</sup> 08	54 <sup>°</sup> 4 <sup>'</sup>	1 <sup>1</sup>	0 <sup>h</sup> 46 <sup>m</sup>	0 <sup>s</sup> 08	16 <sup>°</sup> 2 <sup>'</sup>	0 <sup>1</sup>	26 <sup>h</sup> 67 <sup>m</sup>	0 <sup>s</sup> 09	37 <sup>°</sup> 0 <sup>'</sup>	0 <sup>0</sup>
21	29 <sup>h</sup> 94 <sup>m</sup>	0 <sup>s</sup> 03	53 <sup>°</sup> 3 <sup>'</sup>	1 <sup>3</sup>	0 <sup>h</sup> 38 <sup>m</sup>	0 <sup>s</sup> 04	16 <sup>°</sup> 1 <sup>'</sup>	0 <sup>1</sup>	26 <sup>h</sup> 58 <sup>m</sup>	0 <sup>s</sup> 05	37 <sup>°</sup> 0 <sup>'</sup>	0 <sup>1</sup>
May 1	29 <sup>h</sup> 91 <sup>m</sup>	0 <sup>s</sup> 01	52 <sup>°</sup> 0 <sup>'</sup>	1 <sup>6</sup>	0 <sup>h</sup> 34 <sup>m</sup>	0 <sup>s</sup> 01	16 <sup>°</sup> 0 <sup>'</sup>	0 <sup>1</sup>	26 <sup>h</sup> 53 <sup>m</sup>	0 <sup>s</sup> 00	37 <sup>°</sup> 1 <sup>'</sup>	0 <sup>2</sup>
11	29 <sup>h</sup> 92 <sup>m</sup>	0 <sup>s</sup> 05	50 <sup>°</sup> 4 <sup>'</sup>	1 <sup>7</sup>	0 <sup>h</sup> 35 <sup>m</sup>	0 <sup>s</sup> 05	16 <sup>°</sup> 1 <sup>'</sup>	0 <sup>2</sup>	26 <sup>h</sup> 53 <sup>m</sup>	0 <sup>s</sup> 04	37 <sup>°</sup> 3 <sup>'</sup>	0 <sup>3</sup>
21	29 <sup>h</sup> 97 <sup>m</sup>	0 <sup>s</sup> 11	48 <sup>°</sup> 7 <sup>'</sup>	2 <sup>0</sup>	0 <sup>h</sup> 40 <sup>m</sup>	0 <sup>s</sup> 11	16 <sup>°</sup> 3 <sup>'</sup>	0 <sup>4</sup>	26 <sup>h</sup> 57 <sup>m</sup>	0 <sup>s</sup> 11	37 <sup>°</sup> 6 <sup>'</sup>	0 <sup>5</sup>
31	30 <sup>h</sup> 08 <sup>m</sup>	0 <sup>s</sup> 14	46 <sup>°</sup> 7 <sup>'</sup>	2 <sup>0</sup>	0 <sup>h</sup> 51 <sup>m</sup>	0 <sup>s</sup> 15	16 <sup>°</sup> 7 <sup>'</sup>	0 <sup>5</sup>	26 <sup>h</sup> 68 <sup>m</sup>	0 <sup>s</sup> 14	38 <sup>°</sup> 1 <sup>'</sup>	0 <sup>7</sup>
June 10	30 <sup>h</sup> 22 <sup>m</sup>	0 <sup>s</sup> 18	44 <sup>°</sup> 7 <sup>'</sup>	2 <sup>1</sup>	0 <sup>h</sup> 66 <sup>m</sup>	0 <sup>s</sup> 20	17 <sup>°</sup> 2 <sup>'</sup>	0 <sup>7</sup>	26 <sup>h</sup> 82 <sup>m</sup>	0 <sup>s</sup> 18	38 <sup>°</sup> 8 <sup>'</sup>	0 <sup>8</sup>
20	30 <sup>h</sup> 40 <sup>m</sup>	0 <sup>s</sup> 22	42 <sup>°</sup> 6 <sup>'</sup>	2 <sup>1</sup>	0 <sup>h</sup> 86 <sup>m</sup>	0 <sup>s</sup> 23	17 <sup>°</sup> 9 <sup>'</sup>	0 <sup>7</sup>	27 <sup>h</sup> 00 <sup>m</sup>	0 <sup>s</sup> 22	39 <sup>°</sup> 6 <sup>'</sup>	0 <sup>9</sup>
30	30 <sup>h</sup> 62 <sup>m</sup>	0 <sup>s</sup> 25	40 <sup>°</sup> 5 <sup>'</sup>	2 <sup>0</sup>	1 <sup>h</sup> 09 <sup>m</sup>	0 <sup>s</sup> 25	18 <sup>°</sup> 6 <sup>'</sup>	0 <sup>9</sup>	27 <sup>h</sup> 22 <sup>m</sup>	0 <sup>s</sup> 25	40 <sup>°</sup> 5 <sup>'</sup>	1 <sup>0</sup>
July 10	30 <sup>h</sup> 87 <sup>m</sup>	0 <sup>s</sup> 26	38 <sup>°</sup> 5 <sup>'</sup>	2 <sup>0</sup>	1 <sup>h</sup> 34 <sup>m</sup>	0 <sup>s</sup> 28	19 <sup>°</sup> 5 <sup>'</sup>	1 <sup>0</sup>	27 <sup>h</sup> 47 <sup>m</sup>	0 <sup>s</sup> 27	41 <sup>°</sup> 5 <sup>'</sup>	1 <sup>0</sup>
20	31 <sup>h</sup> 13 <sup>m</sup>	0 <sup>s</sup> 28	36 <sup>°</sup> 5 <sup>'</sup>	1 <sup>8</sup>	1 <sup>h</sup> 62 <sup>m</sup>	0 <sup>s</sup> 30	20 <sup>°</sup> 5 <sup>'</sup>	1 <sup>0</sup>	27 <sup>h</sup> 74 <sup>m</sup>	0 <sup>s</sup> 29	42 <sup>°</sup> 5 <sup>'</sup>	1 <sup>1</sup>
30	31 <sup>h</sup> 41 <sup>m</sup>	0 <sup>s</sup> 29	34 <sup>°</sup> 7 <sup>'</sup>	1 <sup>6</sup>	1 <sup>h</sup> 92 <sup>m</sup>	0 <sup>s</sup> 31	21 <sup>°</sup> 5 <sup>'</sup>	1 <sup>1</sup>	28 <sup>h</sup> 03 <sup>m</sup>	0 <sup>s</sup> 30	43 <sup>°</sup> 6 <sup>'</sup>	1 <sup>1</sup>
Aug. 9	31 <sup>h</sup> 70 <sup>m</sup>	0 <sup>s</sup> 30	33 <sup>°</sup> 1 <sup>'</sup>	1 <sup>3</sup>	2 <sup>h</sup> 23 <sup>m</sup>	0 <sup>s</sup> 31	22 <sup>°</sup> 6 <sup>'</sup>	1 <sup>0</sup>	28 <sup>h</sup> 33 <sup>m</sup>	0 <sup>s</sup> 31	44 <sup>°</sup> 6 <sup>'</sup>	1 <sup>1</sup>
19	32 <sup>h</sup> 00 <sup>m</sup>	0 <sup>s</sup> 29	31 <sup>°</sup> 8 <sup>'</sup>	1 <sup>1</sup>	2 <sup>h</sup> 54 <sup>m</sup>	0 <sup>s</sup> 31	23 <sup>°</sup> 6 <sup>'</sup>	1 <sup>0</sup>	28 <sup>h</sup> 64 <sup>m</sup>	0 <sup>s</sup> 31	45 <sup>°</sup> 7 <sup>'</sup>	0 <sup>9</sup>
29	32 <sup>h</sup> 29 <sup>m</sup>	0 <sup>s</sup> 28	30 <sup>°</sup> 7 <sup>'</sup>	0 <sup>7</sup>	2 <sup>h</sup> 85 <sup>m</sup>	0 <sup>s</sup> 31	24 <sup>°</sup> 6 <sup>'</sup>	0 <sup>9</sup>	28 <sup>h</sup> 95 <sup>m</sup>	0 <sup>s</sup> 30	46 <sup>°</sup> 6 <sup>'</sup>	0 <sup>8</sup>
Sept. 8	32 <sup>h</sup> 57 <sup>m</sup>	0 <sup>s</sup> 27	30 <sup>°</sup> 0 <sup>'</sup>	0 <sup>4</sup>	3 <sup>h</sup> 16 <sup>m</sup>	0 <sup>s</sup> 30	25 <sup>°</sup> 5 <sup>'</sup>	0 <sup>8</sup>	29 <sup>h</sup> 25 <sup>m</sup>	0 <sup>s</sup> 29	47 <sup>°</sup> 4 <sup>'</sup>	0 <sup>7</sup>
18	32 <sup>h</sup> 84 <sup>m</sup>	0 <sup>s</sup> 26	29 <sup>°</sup> 6 <sup>'</sup>	0 <sup>0</sup>	3 <sup>h</sup> 46 <sup>m</sup>	0 <sup>s</sup> 28	26 <sup>°</sup> 3 <sup>'</sup>	0 <sup>7</sup>	29 <sup>h</sup> 54 <sup>m</sup>	0 <sup>s</sup> 29	48 <sup>°</sup> 1 <sup>'</sup>	0 <sup>6</sup>
28	33 <sup>h</sup> 10 <sup>m</sup>	0 <sup>s</sup> 24	29 <sup>°</sup> 6 <sup>'</sup>	0 <sup>4</sup>	3 <sup>h</sup> 74 <sup>m</sup>	0 <sup>s</sup> 27	27 <sup>°</sup> 0 <sup>'</sup>	0 <sup>6</sup>	29 <sup>h</sup> 83 <sup>m</sup>	0 <sup>s</sup> 27	48 <sup>°</sup> 7 <sup>'</sup>	0 <sup>4</sup>
Oct. 8	33 <sup>h</sup> 34 <sup>m</sup>	0 <sup>s</sup> 22	30 <sup>°</sup> 0 <sup>'</sup>	0 <sup>6</sup>	4 <sup>h</sup> 01 <sup>m</sup>	0 <sup>s</sup> 25	27 <sup>°</sup> 6 <sup>'</sup>	0 <sup>4</sup>	30 <sup>h</sup> 10 <sup>m</sup>	0 <sup>s</sup> 25	49 <sup>°</sup> 1 <sup>'</sup>	0 <sup>3</sup>
18	33 <sup>h</sup> 56 <sup>m</sup>	0 <sup>s</sup> 19	30 <sup>°</sup> 6 <sup>'</sup>	0 <sup>9</sup>	4 <sup>h</sup> 26 <sup>m</sup>	0 <sup>s</sup> 22	28 <sup>°</sup> 0 <sup>'</sup>	0 <sup>3</sup>	30 <sup>h</sup> 35 <sup>m</sup>	0 <sup>s</sup> 22	49 <sup>°</sup> 4 <sup>'</sup>	0 <sup>2</sup>
28	33 <sup>h</sup> 75 <sup>m</sup>	0 <sup>s</sup> 16	31 <sup>°</sup> 5 <sup>'</sup>	1 <sup>2</sup>	4 <sup>h</sup> 48 <sup>m</sup>	0 <sup>s</sup> 20	28 <sup>°</sup> 3 <sup>'</sup>	0 <sup>3</sup>	30 <sup>h</sup> 57 <sup>m</sup>	0 <sup>s</sup> 20	49 <sup>°</sup> 6 <sup>'</sup>	0 <sup>1</sup>
Nov. 7	33 <sup>h</sup> 91 <sup>m</sup>	0 <sup>s</sup> 14	32 <sup>°</sup> 7 <sup>'</sup>	1 <sup>3</sup>	4 <sup>h</sup> 68 <sup>m</sup>	0 <sup>s</sup> 17	28 <sup>°</sup> 6 <sup>'</sup>	0 <sup>1</sup>	30 <sup>h</sup> 77 <sup>m</sup>	0 <sup>s</sup> 18	49 <sup>°</sup> 7 <sup>'</sup>	0 <sup>1</sup>
17	34 <sup>h</sup> 05 <sup>m</sup>	0 <sup>s</sup> 10	34 <sup>°</sup> 0 <sup>'</sup>	1 <sup>5</sup>	4 <sup>h</sup> 85 <sup>m</sup>	0 <sup>s</sup> 14	28 <sup>°</sup> 7 <sup>'</sup>	0 <sup>1</sup>	30 <sup>h</sup> 95 <sup>m</sup>	0 <sup>s</sup> 15	49 <sup>°</sup> 6 <sup>'</sup>	0 <sup>1</sup>
27	34 <sup>h</sup> 15 <sup>m</sup>	0 <sup>s</sup> 07	35 <sup>°</sup> 5 <sup>'</sup>	1 <sup>4</sup>	4 <sup>h</sup> 99 <sup>m</sup>	0 <sup>s</sup> 10	28 <sup>°</sup> 8 <sup>'</sup>	0 <sup>1</sup>	31 <sup>h</sup> 10 <sup>m</sup>	0 <sup>s</sup> 11	49 <sup>°</sup> 5 <sup>'</sup>	0 <sup>1</sup>
Dec. 7	34 <sup>h</sup> 22 <sup>m</sup>	0 <sup>s</sup> 03	36 <sup>°</sup> 9 <sup>'</sup>	1 <sup>5</sup>	5 <sup>h</sup> 09 <sup>m</sup>	0 <sup>s</sup> 07	28 <sup>°</sup> 9 <sup>'</sup>	0 <sup>0</sup>	31 <sup>h</sup> 21 <sup>m</sup>	0 <sup>s</sup> 06	49 <sup>°</sup> 4 <sup>'</sup>	0 <sup>2</sup>
17	34 <sup>h</sup> 25 <sup>m</sup>	0 <sup>s</sup> 01	38 <sup>°</sup> 4 <sup>'</sup>	1 <sup>3</sup>	5 <sup>h</sup> 16 <sup>m</sup>	0 <sup>s</sup> 02	28 <sup>°</sup> 9 <sup>'</sup>	0 <sup>0</sup>	31 <sup>h</sup> 27 <sup>m</sup>	0 <sup>s</sup> 03	49 <sup>°</sup> 2 <sup>'</sup>	0 <sup>2</sup>
27	34 <sup>h</sup> 24 <sup>m</sup>	0 <sup>s</sup> 04	39 <sup>°</sup> 7 <sup>'</sup>	1 <sup>3</sup>	5 <sup>h</sup> 18 <sup>m</sup>	0 <sup>s</sup> 02	28 <sup>°</sup> 9 <sup>'</sup>	0 <sup>1</sup>	31 <sup>h</sup> 30 <sup>m</sup>	0 <sup>s</sup> 01	49 <sup>°</sup> 0 <sup>'</sup>	0 <sup>1</sup>
37	34 <sup>h</sup> 20 <sup>m</sup>		41 <sup>°</sup> 0 <sup>'</sup>		5 <sup>h</sup> 16 <sup>m</sup>		28 <sup>°</sup> 8 <sup>'</sup>		31 <sup>h</sup> 29 <sup>m</sup>		48 <sup>°</sup> 9 <sup>'</sup>	



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	♌ Aurigæ.		♉ Leporis.		α Aurigæ. (Capella)	
	R. A.	Dec. North.	R. A.	Dec. South.	R. A.	Dec. North.
	<sup>h</sup> 4 <sup>m</sup> 48	<sup>°</sup> 32 <sup>'</sup> 57	<sup>h</sup> 4 <sup>m</sup> 59	<sup>°</sup> 22 <sup>'</sup> 32	<sup>h</sup> 5 <sup>m</sup> 7	<sup>°</sup> 45 <sup>'</sup> 51
Jan. 1	32° 18' 0.03	24° 2' 0.7	57° 97' 0.04	62° 6' 2.0	5° 93' 0.02	43° 2' 1.4
11	32° 15' 0.08	24° 9' 0.6	57° 93' 0.09	64° 6' 1.7	5° 91' 0.08	44° 6' 1.3
21	32° 07' 0.12	25° 5' 0.5	57° 84' 0.13	66° 3' 1.4	5° 83' 0.14	45° 9' 1.0
31	31° 95' 0.16	26° 0' 0.3	57° 71' 0.16	67° 7' 1.1	5° 69' 0.19	46° 9' 0.8
Feb. 10	31° 79' 0.19	26° 3' 0.2	57° 55' 0.18	68° 8' 0.8	5° 50' 0.22	47° 7' 0.6
20	31° 60' 0.20	26° 5' 0.0	57° 37' 0.20	69° 6' 0.3	5° 28' 0.25	48° 3' 0.3
Mar. 2	31° 40' 0.21	26° 3' 0.2	57° 17' 0.21	69° 9' 0.0	5° 03' 0.26	48° 6' 0.1
12	31° 19' 0.20	26° 3' 0.4	56° 96' 0.21	69° 9' 0.4	4° 77' 0.26	48° 5' 0.3
22	30° 99' 0.19	25° 9' 0.5	56° 75' 0.19	69° 5' 0.8	4° 51' 0.24	48° 2' 0.6
Apr. 1	30° 80' 0.16	25° 4' 0.6	56° 56' 0.17	68° 7' 1.1	4° 27' 0.21	47° 6' 0.9
11	30° 64' 0.11	24° 8' 0.7	56° 39' 0.13	67° 6' 1.4	4° 06' 0.16	46° 7' 1.1
21	30° 53' 0.08	24° 1' 0.7	56° 26' 0.10	66° 2' 1.8	3° 90' 0.11	45° 6' 1.2
May 1	30° 45' 0.03	23° 4' 0.7	56° 16' 0.06	64° 4' 2.0	3° 79' 0.06	44° 4' 1.2
11	30° 42' 0.04	22° 7' 0.6	56° 10' 0.02	62° 4' 2.2	3° 73' 0.01	43° 2' 1.3
21	30° 46' 0.09	22° 1' 0.6	56° 08' 0.04	60° 2' 2.5	3° 74' 0.07	41° 9' 1.3
31	30° 55' 0.15	21° 5' 0.4	56° 12' 0.08	57° 7' 2.8	3° 81' 0.14	40° 6' 1.3
June 10	30° 70' 0.18	21° 1' 0.3	56° 20' 0.13	54° 9' 2.6	3° 95' 0.19	39° 3' 1.1
20	30° 88' 0.23	20° 8' 0.1	56° 33' 0.16	52° 3' 2.7	4° 14' 0.24	38° 2' 1.0
30	31° 11' 0.27	20° 7' 0.1	56° 49' 0.20	49° 6' 2.6	4° 38' 0.29	37° 2' 0.7
July 10	31° 38' 0.29	20° 8' 0.2	56° 69' 0.24	47° 0' 2.4	4° 67' 0.33	36° 5' 0.6
20	31° 67' 0.32	21° 0' 0.3	56° 93' 0.26	44° 6' 2.2	5° 00' 0.36	35° 9' 0.4
30	31° 99' 0.33	21° 3' 0.4	57° 19' 0.27	42° 4' 1.9	5° 36' 0.38	35° 5' 0.1
Aug. 9	32° 32' 0.34	21° 7' 0.6	57° 46' 0.28	40° 5' 1.6	5° 74' 0.40	35° 4' 0.0
19	32° 66' 0.35	22° 3' 0.6	57° 74' 0.29	38° 9' 1.2	6° 14' 0.40	35° 4' 0.2
29	33° 01' 0.34	22° 9' 0.7	58° 03' 0.30	37° 7' 0.8	6° 54' 0.41	35° 6' 0.4
Sept. 8	33° 35' 0.35	23° 6' 0.7	58° 33' 0.30	36° 9' 0.2	6° 95' 0.41	36° 0' 0.6
18	33° 70' 0.33	24° 3' 0.8	58° 63' 0.29	36° 7' 0.2	7° 36' 0.41	36° 6' 0.8
28	34° 03' 0.31	25° 1' 0.8	58° 92' 0.28	36° 9' 0.7	7° 77' 0.39	37° 4' 0.9
Oct. 8	34° 34' 0.30	25° 9' 0.8	59° 20' 0.26	37° 6' 1.2	8° 16' 0.37	38° 3' 1.0
18	34° 64' 0.28	26° 7' 0.8	59° 46' 0.24	38° 8' 1.5	8° 53' 0.35	39° 3' 1.1
28	34° 92' 0.26	27° 5' 0.9	59° 70' 0.21	40° 3' 1.8	8° 88' 0.32	40° 4' 1.3
Nov. 7	35° 18' 0.22	28° 4' 0.8	59° 91' 0.18	42° 1' 2.2	9° 20' 0.28	41° 7' 1.4
17	35° 40' 0.18	29° 2' 0.9	60° 09' 0.15	44° 3' 2.3	9° 48' 0.24	43° 1' 1.5
27	35° 58' 0.15	30° 1' 0.8	60° 24' 0.11	46° 6' 2.4	9° 72' 0.19	44° 6' 1.6
Dec. 7	35° 73' 0.10	30° 9' 0.9	60° 35' 0.07	49° 0' 2.4	9° 91' 0.14	46° 2' 1.5
17	35° 83' 0.05	31° 8' 0.8	60° 42' 0.02	51° 4' 2.2	10° 05' 0.08	47° 7' 1.6
27	35° 88' 0.01	32° 6' 0.7	60° 44' 0.02	53° 6' 2.2	10° 13' 0.02	49° 3' 1.4
37	35° 89' 0.01	33° 3' 0.7	60° 42' 0.02	55° 8' 2.2	10° 15' 0.02	50° 7' 1.4



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Orionis. (Rigel)		$\beta$ Tauri.		$\delta$ Orionis.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. South.
	<sup>h</sup> 5	<sup>m</sup> 8	<sup>h</sup> 5	<sup>m</sup> 18	<sup>h</sup> 5	<sup>m</sup> 25
	<sup>°</sup> 8	<sup>'</sup> 21	<sup>°</sup> 28	<sup>'</sup> 29	<sup>°</sup> 0	<sup>'</sup> 23
<b>Jan.</b> 1	17 <sup>h</sup> 83 <sup>m</sup>	24 <sup>°</sup> 0 <sup>'</sup>	4 <sup>h</sup> 87 <sup>m</sup>	36 <sup>°</sup> 6 <sup>'</sup>	22 <sup>h</sup> 38 <sup>m</sup>	60 <sup>°</sup> 1 <sup>'</sup>
11	17 <sup>h</sup> 81 <sup>m</sup> 0 <sup>s</sup> 02	25 <sup>°</sup> 5 <sup>'</sup> 1 <sup>s</sup> 5	4 <sup>h</sup> 88 <sup>m</sup> 0 <sup>s</sup> 01	37 <sup>°</sup> 0 <sup>'</sup> 4	22 <sup>h</sup> 38 <sup>m</sup> 0 <sup>s</sup> 00	61 <sup>°</sup> 2 <sup>'</sup> 1 <sup>s</sup> 1
21	17 <sup>h</sup> 75 <sup>m</sup> 0 <sup>s</sup> 06	26 <sup>°</sup> 8 <sup>'</sup> 1 <sup>s</sup> 3	4 <sup>h</sup> 83 <sup>m</sup> 0 <sup>s</sup> 05	37 <sup>°</sup> 5 <sup>'</sup> 5	22 <sup>h</sup> 38 <sup>m</sup> 0 <sup>s</sup> 04	62 <sup>°</sup> 2 <sup>'</sup> 1 <sup>s</sup> 0
31	17 <sup>h</sup> 65 <sup>m</sup> 0 <sup>s</sup> 10	27 <sup>°</sup> 8 <sup>'</sup> 1 <sup>s</sup> 0	4 <sup>h</sup> 74 <sup>m</sup> 0 <sup>s</sup> 09	37 <sup>°</sup> 9 <sup>'</sup> 4	22 <sup>h</sup> 34 <sup>m</sup> 0 <sup>s</sup> 09	63 <sup>°</sup> 0 <sup>'</sup> 8
	0 <sup>s</sup> 13	0 <sup>s</sup> 8	0 <sup>s</sup> 13	0 <sup>s</sup> 3	0 <sup>s</sup> 12	0 <sup>s</sup> 7
<b>Feb.</b> 10	17 <sup>h</sup> 52 <sup>m</sup> 0 <sup>s</sup> 16	28 <sup>°</sup> 6 <sup>'</sup> 0 <sup>s</sup> 6	4 <sup>h</sup> 61 <sup>m</sup> 0 <sup>s</sup> 17	38 <sup>°</sup> 2 <sup>'</sup> 2	22 <sup>h</sup> 13 <sup>m</sup> 0 <sup>s</sup> 14	63 <sup>°</sup> 7 <sup>'</sup> 4
20	17 <sup>h</sup> 36 <sup>m</sup> 0 <sup>s</sup> 18	29 <sup>°</sup> 2 <sup>'</sup> 0 <sup>s</sup> 4	4 <sup>h</sup> 44 <sup>m</sup> 0 <sup>s</sup> 19	38 <sup>°</sup> 4 <sup>'</sup> 1	21 <sup>h</sup> 99 <sup>m</sup> 0 <sup>s</sup> 17	64 <sup>°</sup> 1 <sup>'</sup> 3
<b>Mar.</b> 2	17 <sup>h</sup> 18 <sup>m</sup> 0 <sup>s</sup> 19	29 <sup>°</sup> 6 <sup>'</sup> 0 <sup>s</sup> 0	4 <sup>h</sup> 25 <sup>m</sup> 0 <sup>s</sup> 20	38 <sup>°</sup> 5 <sup>'</sup> 0	21 <sup>h</sup> 82 <sup>m</sup> 0 <sup>s</sup> 18	64 <sup>°</sup> 4 <sup>'</sup> 1
12	16 <sup>h</sup> 99 <sup>m</sup> 0 <sup>s</sup> 18	29 <sup>°</sup> 6 <sup>'</sup> 0 <sup>s</sup> 2	4 <sup>h</sup> 05 <sup>m</sup> 0 <sup>s</sup> 20	38 <sup>°</sup> 5 <sup>'</sup> 1	21 <sup>h</sup> 64 <sup>m</sup> 0 <sup>s</sup> 18	64 <sup>°</sup> 5 <sup>'</sup> 0
	0 <sup>s</sup> 17	0 <sup>s</sup> 4	0 <sup>s</sup> 19	0 <sup>s</sup> 3	0 <sup>s</sup> 17	0 <sup>s</sup> 3
<b>Apr.</b> 1	16 <sup>h</sup> 81 <sup>m</sup> 0 <sup>s</sup> 15	29 <sup>°</sup> 0 <sup>'</sup> 7	3 <sup>h</sup> 66 <sup>m</sup> 0 <sup>s</sup> 16	38 <sup>°</sup> 1 <sup>'</sup> 3	21 <sup>h</sup> 29 <sup>m</sup> 0 <sup>s</sup> 15	64 <sup>°</sup> 2 <sup>'</sup> 4
11	16 <sup>h</sup> 64 <sup>m</sup> 0 <sup>s</sup> 12	28 <sup>°</sup> 3 <sup>'</sup> 9	3 <sup>h</sup> 50 <sup>m</sup> 0 <sup>s</sup> 13	37 <sup>°</sup> 8 <sup>'</sup> 4	21 <sup>h</sup> 14 <sup>m</sup> 0 <sup>s</sup> 13	63 <sup>°</sup> 8 <sup>'</sup> 7
21	16 <sup>h</sup> 49 <sup>m</sup> 0 <sup>s</sup> 09	27 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 2	3 <sup>h</sup> 37 <sup>m</sup> 0 <sup>s</sup> 10	37 <sup>°</sup> 4 <sup>'</sup> 4	21 <sup>h</sup> 01 <sup>m</sup> 0 <sup>s</sup> 10	63 <sup>°</sup> 1 <sup>'</sup> 8
<b>May</b> 1	16 <sup>h</sup> 28 <sup>m</sup> 0 <sup>s</sup> 05	26 <sup>°</sup> 2 <sup>'</sup> 1 <sup>s</sup> 4	3 <sup>h</sup> 27 <sup>m</sup> 0 <sup>s</sup> 05	37 <sup>°</sup> 0 <sup>'</sup> 4	20 <sup>h</sup> 91 <sup>m</sup> 0 <sup>s</sup> 05	62 <sup>°</sup> 3 <sup>'</sup> 9
11	16 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 00	24 <sup>°</sup> 8 <sup>'</sup> 1 <sup>s</sup> 6	3 <sup>h</sup> 22 <sup>m</sup> 0 <sup>s</sup> 01	36 <sup>°</sup> 6 <sup>'</sup> 4	20 <sup>h</sup> 86 <sup>m</sup> 0 <sup>s</sup> 01	61 <sup>°</sup> 4 <sup>'</sup> 2
21	16 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 03	23 <sup>°</sup> 2 <sup>'</sup> 1 <sup>s</sup> 8	3 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 05	36 <sup>°</sup> 2 <sup>'</sup> 3	20 <sup>h</sup> 85 <sup>m</sup> 0 <sup>s</sup> 03	60 <sup>°</sup> 2 <sup>'</sup> 1 <sup>s</sup> 3
31	16 <sup>h</sup> 26 <sup>m</sup> 0 <sup>s</sup> 09	21 <sup>°</sup> 4 <sup>'</sup> 2 <sup>s</sup> 0	3 <sup>h</sup> 28 <sup>m</sup> 0 <sup>s</sup> 10	35 <sup>°</sup> 9 <sup>'</sup> 3	20 <sup>h</sup> 88 <sup>m</sup> 0 <sup>s</sup> 07	58 <sup>°</sup> 9 <sup>'</sup> 1 <sup>s</sup> 4
<b>June</b> 10	16 <sup>h</sup> 35 <sup>m</sup> 0 <sup>s</sup> 13	19 <sup>°</sup> 4 <sup>'</sup> 2 <sup>s</sup> 0	3 <sup>h</sup> 38 <sup>m</sup> 0 <sup>s</sup> 16	35 <sup>°</sup> 6 <sup>'</sup> 1	20 <sup>h</sup> 95 <sup>m</sup> 0 <sup>s</sup> 12	57 <sup>°</sup> 5 <sup>'</sup> 1 <sup>s</sup> 6
20	16 <sup>h</sup> 48 <sup>m</sup> 0 <sup>s</sup> 17	17 <sup>°</sup> 4 <sup>'</sup> 2 <sup>s</sup> 0	3 <sup>h</sup> 54 <sup>m</sup> 0 <sup>s</sup> 20	35 <sup>°</sup> 5 <sup>'</sup> 0	21 <sup>h</sup> 07 <sup>m</sup> 0 <sup>s</sup> 16	55 <sup>°</sup> 9 <sup>'</sup> 1 <sup>s</sup> 6
30	16 <sup>h</sup> 65 <sup>m</sup> 0 <sup>s</sup> 19	15 <sup>°</sup> 4 <sup>'</sup> 2 <sup>s</sup> 0	3 <sup>h</sup> 74 <sup>m</sup> 0 <sup>s</sup> 23	35 <sup>°</sup> 5 <sup>'</sup> 0	21 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 19	54 <sup>°</sup> 3 <sup>'</sup> 1 <sup>s</sup> 6
<b>July</b> 10	16 <sup>h</sup> 84 <sup>m</sup> 0 <sup>s</sup> 23	13 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 9	3 <sup>h</sup> 97 <sup>m</sup> 0 <sup>s</sup> 26	35 <sup>°</sup> 5 <sup>'</sup> 2	21 <sup>h</sup> 42 <sup>m</sup> 0 <sup>s</sup> 22	52 <sup>°</sup> 7 <sup>'</sup> 1 <sup>s</sup> 6
20	17 <sup>h</sup> 07 <sup>m</sup> 0 <sup>s</sup> 25	11 <sup>°</sup> 5 <sup>'</sup> 1 <sup>s</sup> 8	4 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 28	35 <sup>°</sup> 7 <sup>'</sup> 0 <sup>s</sup> 3	21 <sup>h</sup> 64 <sup>m</sup> 0 <sup>s</sup> 24	51 <sup>°</sup> 1 <sup>'</sup> 1 <sup>s</sup> 5
30	17 <sup>h</sup> 32 <sup>m</sup> 0 <sup>s</sup> 26	9 <sup>°</sup> 7 <sup>'</sup> 1 <sup>s</sup> 6	4 <sup>h</sup> 51 <sup>m</sup> 0 <sup>s</sup> 31	36 <sup>°</sup> 0 <sup>'</sup> 4	21 <sup>h</sup> 88 <sup>m</sup> 0 <sup>s</sup> 25	49 <sup>°</sup> 6 <sup>'</sup> 1 <sup>s</sup> 3
<b>Aug.</b> 9	17 <sup>h</sup> 58 <sup>m</sup> 0 <sup>s</sup> 28	8 <sup>°</sup> 1 <sup>'</sup> 1 <sup>s</sup> 4	4 <sup>h</sup> 82 <sup>m</sup> 0 <sup>s</sup> 32	36 <sup>°</sup> 4 <sup>'</sup> 4	22 <sup>h</sup> 13 <sup>m</sup> 0 <sup>s</sup> 27	48 <sup>°</sup> 3 <sup>'</sup> 1 <sup>s</sup> 2
19	17 <sup>h</sup> 86 <sup>m</sup> 0 <sup>s</sup> 28	6 <sup>°</sup> 7 <sup>'</sup> 1 <sup>s</sup> 1	5 <sup>h</sup> 14 <sup>m</sup> 0 <sup>s</sup> 32	36 <sup>°</sup> 8 <sup>'</sup> 4	22 <sup>h</sup> 40 <sup>m</sup> 0 <sup>s</sup> 29	47 <sup>°</sup> 1 <sup>'</sup> 0 <sup>s</sup> 9
	0 <sup>s</sup> 28	1 <sup>s</sup> 1	0 <sup>s</sup> 32	0 <sup>s</sup> 4	0 <sup>s</sup> 29	0 <sup>s</sup> 9
<b>Sept.</b> 29	18 <sup>h</sup> 14 <sup>m</sup> 0 <sup>s</sup> 29	5 <sup>°</sup> 6 <sup>'</sup> 0 <sup>s</sup> 7	5 <sup>h</sup> 46 <sup>m</sup> 0 <sup>s</sup> 33	37 <sup>°</sup> 2 <sup>'</sup> 5	22 <sup>h</sup> 69 <sup>m</sup> 0 <sup>s</sup> 28	46 <sup>°</sup> 2 <sup>'</sup> 0 <sup>s</sup> 7
8	18 <sup>h</sup> 43 <sup>m</sup> 0 <sup>s</sup> 28	4 <sup>°</sup> 9 <sup>'</sup> 0 <sup>s</sup> 4	5 <sup>h</sup> 79 <sup>m</sup> 0 <sup>s</sup> 33	37 <sup>°</sup> 7 <sup>'</sup> 4	22 <sup>h</sup> 97 <sup>m</sup> 0 <sup>s</sup> 29	45 <sup>°</sup> 5 <sup>'</sup> 0 <sup>s</sup> 4
18	18 <sup>h</sup> 71 <sup>m</sup> 0 <sup>s</sup> 28	4 <sup>°</sup> 5 <sup>'</sup> 0 <sup>s</sup> 0	6 <sup>h</sup> 12 <sup>m</sup> 0 <sup>s</sup> 33	38 <sup>°</sup> 1 <sup>'</sup> 5	23 <sup>h</sup> 26 <sup>m</sup> 0 <sup>s</sup> 28	45 <sup>°</sup> 1 <sup>'</sup> 0 <sup>s</sup> 1
28	18 <sup>h</sup> 99 <sup>m</sup> 0 <sup>s</sup> 27	4 <sup>°</sup> 5 <sup>'</sup> 0 <sup>s</sup> 3	6 <sup>h</sup> 45 <sup>m</sup> 0 <sup>s</sup> 32	38 <sup>°</sup> 6 <sup>'</sup> 4	23 <sup>h</sup> 54 <sup>m</sup> 0 <sup>s</sup> 28	45 <sup>°</sup> 0 <sup>'</sup> 2 <sup>s</sup> 2
<b>Oct.</b> 8	19 <sup>h</sup> 26 <sup>m</sup> 0 <sup>s</sup> 26	4 <sup>°</sup> 8 <sup>'</sup> 0 <sup>s</sup> 7	6 <sup>h</sup> 77 <sup>m</sup> 0 <sup>s</sup> 31	39 <sup>°</sup> 0 <sup>'</sup> 4	23 <sup>h</sup> 82 <sup>m</sup> 0 <sup>s</sup> 27	45 <sup>°</sup> 2 <sup>'</sup> 0 <sup>s</sup> 5
18	19 <sup>h</sup> 52 <sup>m</sup> 0 <sup>s</sup> 24	5 <sup>°</sup> 5 <sup>'</sup> 1 <sup>s</sup> 1	7 <sup>h</sup> 08 <sup>m</sup> 0 <sup>s</sup> 29	39 <sup>°</sup> 4 <sup>'</sup> 4	24 <sup>h</sup> 09 <sup>m</sup> 0 <sup>s</sup> 25	45 <sup>°</sup> 7 <sup>'</sup> 0 <sup>s</sup> 7
28	19 <sup>h</sup> 76 <sup>m</sup> 0 <sup>s</sup> 22	6 <sup>°</sup> 6 <sup>'</sup> 1 <sup>s</sup> 3	7 <sup>h</sup> 37 <sup>m</sup> 0 <sup>s</sup> 27	39 <sup>°</sup> 8 <sup>'</sup> 4	24 <sup>h</sup> 34 <sup>m</sup> 0 <sup>s</sup> 24	46 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 0
<b>Nov.</b> 7	19 <sup>h</sup> 98 <sup>m</sup> 0 <sup>s</sup> 19	7 <sup>°</sup> 9 <sup>'</sup> 1 <sup>s</sup> 5	7 <sup>h</sup> 64 <sup>m</sup> 0 <sup>s</sup> 24	40 <sup>°</sup> 2 <sup>'</sup> 4	24 <sup>h</sup> 58 <sup>m</sup> 0 <sup>s</sup> 21	47 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 1
17	20 <sup>h</sup> 17 <sup>m</sup> 0 <sup>s</sup> 16	9 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 6	7 <sup>h</sup> 88 <sup>m</sup> 0 <sup>s</sup> 21	40 <sup>°</sup> 6 <sup>'</sup> 5	24 <sup>h</sup> 79 <sup>m</sup> 0 <sup>s</sup> 18	48 <sup>°</sup> 5 <sup>'</sup> 1 <sup>s</sup> 3
27	20 <sup>h</sup> 33 <sup>m</sup> 0 <sup>s</sup> 13	11 <sup>°</sup> 0 <sup>'</sup> 1 <sup>s</sup> 7	8 <sup>h</sup> 09 <sup>m</sup> 0 <sup>s</sup> 18	41 <sup>°</sup> 1 <sup>'</sup> 4	24 <sup>h</sup> 97 <sup>m</sup> 0 <sup>s</sup> 15	49 <sup>°</sup> 8 <sup>'</sup> 1 <sup>s</sup> 3
<b>Dec.</b> 7	20 <sup>h</sup> 46 <sup>m</sup> 0 <sup>s</sup> 09	12 <sup>°</sup> 7 <sup>'</sup> 1 <sup>s</sup> 7	8 <sup>h</sup> 27 <sup>m</sup> 0 <sup>s</sup> 13	41 <sup>°</sup> 5 <sup>'</sup> 5	25 <sup>h</sup> 12 <sup>m</sup> 0 <sup>s</sup> 11	51 <sup>°</sup> 1 <sup>'</sup> 1 <sup>s</sup> 3
17	20 <sup>h</sup> 55 <sup>m</sup> 0 <sup>s</sup> 05	14 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 6	8 <sup>h</sup> 40 <sup>m</sup> 0 <sup>s</sup> 08	42 <sup>°</sup> 0 <sup>'</sup> 5	25 <sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 08	52 <sup>°</sup> 4 <sup>'</sup> 1 <sup>s</sup> 3
27	20 <sup>h</sup> 60 <sup>m</sup> 0 <sup>s</sup> 01	16 <sup>°</sup> 0 <sup>'</sup> 1 <sup>s</sup> 6	8 <sup>h</sup> 48 <sup>m</sup> 0 <sup>s</sup> 03	42 <sup>°</sup> 5 <sup>'</sup> 5	25 <sup>h</sup> 31 <sup>m</sup> 0 <sup>s</sup> 03	53 <sup>°</sup> 7 <sup>'</sup> 1 <sup>s</sup> 1
37	20 <sup>h</sup> 61 <sup>m</sup> 0 <sup>s</sup> 01	17 <sup>°</sup> 6 <sup>'</sup> 1 <sup>s</sup> 6	8 <sup>h</sup> 51 <sup>m</sup> 0 <sup>s</sup> 03	43 <sup>°</sup> 0 <sup>'</sup> 5	25 <sup>h</sup> 34 <sup>m</sup> 0 <sup>s</sup> 03	54 <sup>°</sup> 8 <sup>'</sup> 1 <sup>s</sup> 1



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Leporis.		$\epsilon$ Orionis.		$\alpha$ Columbæ.	
	R. A.	Dec. South.	R. A.	Dec. South.	R. A.	Dec. South.
	<sup>h</sup> 5 <sup>m</sup> 26	<sup>°</sup> 17 <sup>'</sup> 54	<sup>h</sup> 5 <sup>m</sup> 29	<sup>°</sup> 1 <sup>'</sup> 17	<sup>h</sup> 5 <sup>m</sup> 34	<sup>°</sup> 34 <sup>'</sup> 8
Jan. 1	60° 43' 00" 01	71° 7' 19"	37° 43' 00" 00	22° 1' 12"	57° 64' 00" 03	50° 4' 26"
11	60° 42' 00" 06	73° 6' 18"	37° 43' 00" 04	23° 3' 10"	57° 61' 00" 09	53° 0' 23"
21	60° 36' 00" 10	75° 4' 14"	37° 39' 00" 07	24° 3' 09"	57° 52' 00" 13	55° 3' 20"
31	60° 26' 00" 14	76° 8' 12"	37° 32' 00" 12	25° 2' 07"	57° 39' 00" 18	57° 3' 15"
Feb. 10	60° 12' 00" 17	78° 0' 08"	37° 20' 00" 15	25° 9' 05"	57° 21' 00" 21	58° 8' 12"
20	59° 95' 00" 19	78° 8' 05"	37° 05' 00" 17	26° 4' 03"	57° 00' 00" 23	60° 0' 07"
Mar. 2	59° 76' 00" 20	79° 3' 02"	36° 88' 00" 18	26° 7' 01"	56° 77' 00" 24	60° 7' 03"
12	59° 56' 00" 19	79° 5' 02"	36° 70' 00" 19	26° 8' 01"	56° 53' 00" 24	61° 0' 02"
22	59° 37' 00" 19	79° 3' 05"	36° 51' 00" 17	26° 7' 03"	56° 29' 00" 24	60° 8' 07"
Apr. 1	59° 18' 00" 18	78° 8' 08"	36° 34' 00" 15	26° 4' 04"	56° 05' 00" 22	60° 1' 10"
11	59° 00' 00" 15	78° 0' 12"	36° 19' 00" 13	26° 0' 07"	55° 83' 00" 19	59° 1' 15"
21	58° 85' 00" 11	76° 8' 14"	36° 06' 00" 09	25° 3' 08"	55° 64' 00" 16	57° 6' 18"
May 1	58° 74' 00" 07	75° 4' 17"	35° 97' 00" 06	24° 5' 10"	55° 48' 00" 12	55° 8' 22"
11	58° 67' 00" 03	73° 7' 19"	35° 91' 00" 02	23° 5' 12"	55° 36' 00" 06	53° 6' 25"
21	58° 64' 00" 01	71° 8' 22"	35° 89' 00" 03	22° 3' 13"	55° 30' 00" 02	51° 1' 27"
31	58° 65' 00" 06	69° 6' 23"	35° 92' 00" 07	21° 0' 14"	55° 28' 00" 02	48° 4' 29"
June 10	58° 71' 00" 11	67° 3' 26"	35° 99' 00" 12	19° 6' 17"	55° 30' 00" 09	45° 5' 32"
20	58° 82' 00" 14	64° 7' 24"	36° 11' 00" 15	17° 9' 16"	55° 39' 00" 12	42° 3' 30"
30	58° 96' 00" 17	62° 3' 24"	36° 26' 00" 18	16° 3' 17"	55° 51' 00" 17	39° 3' 30"
July 10	59° 13' 00" 21	59° 9' 23"	36° 44' 00" 21	14° 6' 16"	55° 68' 00" 20	36° 3' 28"
20	59° 34' 00" 24	57° 6' 21"	36° 65' 00" 24	13° 0' 15"	55° 88' 00" 24	33° 5' 26"
30	59° 58' 00" 25	55° 5' 19"	36° 89' 00" 26	11° 5' 13"	56° 12' 00" 27	30° 9' 23"
Aug. 9	59° 83' 00" 27	53° 6' 16"	37° 15' 00" 27	10° 2' 12"	56° 39' 00" 29	28° 6' 19"
19	60° 10' 00" 29	52° 0' 12"	37° 42' 00" 28	9° 0' 10"	56° 68' 00" 30	26° 7' 15"
29	60° 39' 00" 29	50° 8' 08"	37° 70' 00" 28	8° 0' 07"	56° 98' 00" 31	25° 2' 09"
Sept. 8	60° 68' 00" 29	50° 0' 04"	37° 98' 00" 29	7° 3' 04"	57° 29' 00" 32	24° 3' 04"
18	60° 97' 00" 29	49° 6' 01"	38° 27' 00" 28	6° 9' 01"	57° 61' 00" 32	23° 9' 01"
28	61° 26' 00" 28	49° 7' 05"	38° 55' 00" 28	6° 8' 03"	57° 93' 00" 31	24° 0' 07"
Oct. 8	61° 54' 00" 27	50° 2' 09"	38° 83' 00" 27	7° 1' 05"	58° 24' 00" 30	24° 7' 13"
18	61° 81' 00" 25	51° 1' 13"	39° 10' 00" 26	7° 6' 08"	58° 54' 00" 28	26° 0' 17"
28	62° 06' 00" 23	52° 4' 17"	39° 36' 00" 23	8° 4' 10"	58° 82' 00" 25	27° 7' 22"
Nov. 7	62° 29' 00" 21	54° 1' 20"	39° 59' 00" 21	9° 4' 12"	59° 07' 00" 22	29° 9' 25"
17	62° 50' 00" 18	56° 1' 21"	39° 80' 00" 19	10° 6' 13"	59° 29' 00" 19	32° 4' 27"
27	62° 68' 00" 14	58° 2' 22"	39° 99' 00" 16	11° 9' 13"	59° 48' 00" 14	35° 1' 29"
Dec. 7	62° 82' 00" 10	60° 4' 23"	40° 15' 00" 11	13° 2' 14"	59° 62' 00" 09	38° 0' 29"
17	62° 92' 00" 05	62° 7' 22"	40° 26' 00" 08	14° 6' 14"	59° 71' 00" 04	40° 9' 29"
27	62° 97' 00" 02	64° 9' 20"	40° 34' 00" 03	16° 0' 12"	59° 75' 00" 00	43° 8' 28"
37	62° 99' 00" 00	66° 9' 20"	40° 37' 00" 00	17° 2' 12"	59° 75' 00" 00	46° 6' 28"



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Orionis.		$\nu$ Orionis.		$\mu$ Geminorum.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 5 <sup>m</sup> 48	<sup>°</sup> 7 <sup>'</sup> 22	<sup>h</sup> 6 <sup>m</sup> 0	<sup>°</sup> 14 <sup>'</sup> 46	<sup>h</sup> 6 <sup>m</sup> 15	<sup>°</sup> 22 <sup>'</sup> 34
Jan. 1	8 <sup>s</sup> .43 <sup>s</sup> .02	42 <sup>s</sup> .4 <sup>s</sup> .8	9 <sup>s</sup> .38 <sup>s</sup> .04	47 <sup>s</sup> .4 <sup>s</sup> .3	6 <sup>s</sup> .15 <sup>s</sup> .06	33 <sup>s</sup> .6 <sup>s</sup> .1
11	8 <sup>s</sup> .45 <sup>s</sup> .02	41 <sup>s</sup> .6 <sup>s</sup> .6	9 <sup>s</sup> .42 <sup>s</sup> .00	47 <sup>s</sup> .1 <sup>s</sup> .3	6 <sup>s</sup> .21 <sup>s</sup> .01	33 <sup>s</sup> .7 <sup>s</sup> .2
21	8 <sup>s</sup> .43 <sup>s</sup> .06	41 <sup>s</sup> .0 <sup>s</sup> .5	9 <sup>s</sup> .42 <sup>s</sup> .05	46 <sup>s</sup> .8 <sup>s</sup> .1	6 <sup>s</sup> .22 <sup>s</sup> .04	33 <sup>s</sup> .9 <sup>s</sup> .2
31	8 <sup>s</sup> .37 <sup>s</sup> .10	40 <sup>s</sup> .5 <sup>s</sup> .4	9 <sup>s</sup> .37 <sup>s</sup> .10	46 <sup>s</sup> .7 <sup>s</sup> .1	6 <sup>s</sup> .18 <sup>s</sup> .08	34 <sup>s</sup> .1 <sup>s</sup> .3
Feb. 10	8 <sup>s</sup> .27 <sup>s</sup> .13	40 <sup>s</sup> .1 <sup>s</sup> .3	9 <sup>s</sup> .27 <sup>s</sup> .13	46 <sup>s</sup> .6 <sup>s</sup> .1	6 <sup>s</sup> .10 <sup>s</sup> .13	34 <sup>s</sup> .4 <sup>s</sup> .2
20	8 <sup>s</sup> .14 <sup>s</sup> .16	39 <sup>s</sup> .8 <sup>s</sup> .2	9 <sup>s</sup> .14 <sup>s</sup> .16	46 <sup>s</sup> .5 <sup>s</sup> .0	5 <sup>s</sup> .97 <sup>s</sup> .16	34 <sup>s</sup> .6 <sup>s</sup> .3
Mar. 2	7 <sup>s</sup> .98 <sup>s</sup> .18	39 <sup>s</sup> .6 <sup>s</sup> .1	8 <sup>s</sup> .98 <sup>s</sup> .17	46 <sup>s</sup> .5 <sup>s</sup> .1	5 <sup>s</sup> .81 <sup>s</sup> .18	34 <sup>s</sup> .9 <sup>s</sup> .2
12	7 <sup>s</sup> .80 <sup>s</sup> .18	39 <sup>s</sup> .5 <sup>s</sup> .1	8 <sup>s</sup> .81 <sup>s</sup> .19	46 <sup>s</sup> .6 <sup>s</sup> .0	5 <sup>s</sup> .63 <sup>s</sup> .19	35 <sup>s</sup> .1 <sup>s</sup> .1
22	7 <sup>s</sup> .62 <sup>s</sup> .18	39 <sup>s</sup> .6 <sup>s</sup> .1	8 <sup>s</sup> .62 <sup>s</sup> .18	46 <sup>s</sup> .6 <sup>s</sup> .1	5 <sup>s</sup> .44 <sup>s</sup> .19	35 <sup>s</sup> .2 <sup>s</sup> .1
Apr. 1	7 <sup>s</sup> .44 <sup>s</sup> .16	39 <sup>s</sup> .7 <sup>s</sup> .3	8 <sup>s</sup> .44 <sup>s</sup> .16	46 <sup>s</sup> .7 <sup>s</sup> .2	5 <sup>s</sup> .25 <sup>s</sup> .18	35 <sup>s</sup> .3 <sup>s</sup> .1
11	7 <sup>s</sup> .28 <sup>s</sup> .14	40 <sup>s</sup> .0 <sup>s</sup> .3	8 <sup>s</sup> .28 <sup>s</sup> .15	46 <sup>s</sup> .9 <sup>s</sup> .1	5 <sup>s</sup> .07 <sup>s</sup> .15	35 <sup>s</sup> .4 <sup>s</sup> .0
21	7 <sup>s</sup> .14 <sup>s</sup> .10	40 <sup>s</sup> .3 <sup>s</sup> .5	8 <sup>s</sup> .13 <sup>s</sup> .11	47 <sup>s</sup> .0 <sup>s</sup> .2	4 <sup>s</sup> .92 <sup>s</sup> .12	35 <sup>s</sup> .4 <sup>s</sup> .0
May 1	7 <sup>s</sup> .04 <sup>s</sup> .07	40 <sup>s</sup> .8 <sup>s</sup> .6	8 <sup>s</sup> .02 <sup>s</sup> .08	47 <sup>s</sup> .2 <sup>s</sup> .3	4 <sup>s</sup> .80 <sup>s</sup> .09	35 <sup>s</sup> .4 <sup>s</sup> .1
11	6 <sup>s</sup> .97 <sup>s</sup> .02	41 <sup>s</sup> .4 <sup>s</sup> .7	7 <sup>s</sup> .94 <sup>s</sup> .03	47 <sup>s</sup> .5 <sup>s</sup> .3	4 <sup>s</sup> .71 <sup>s</sup> .05	35 <sup>s</sup> .3 <sup>s</sup> .0
21	6 <sup>s</sup> .95 <sup>s</sup> .01	42 <sup>s</sup> .1 <sup>s</sup> .8	7 <sup>s</sup> .91 <sup>s</sup> .01	47 <sup>s</sup> .8 <sup>s</sup> .3	4 <sup>s</sup> .66 <sup>s</sup> .00	35 <sup>s</sup> .3 <sup>s</sup> .0
31	6 <sup>s</sup> .96 <sup>s</sup> .06	42 <sup>s</sup> .9 <sup>s</sup> .0	7 <sup>s</sup> .92 <sup>s</sup> .06	48 <sup>s</sup> .2 <sup>s</sup> .5	4 <sup>s</sup> .66 <sup>s</sup> .04	35 <sup>s</sup> .3 <sup>s</sup> .0
June 10	7 <sup>s</sup> .02 <sup>s</sup> .11	43 <sup>s</sup> .9 <sup>s</sup> .1	7 <sup>s</sup> .98 <sup>s</sup> .09	48 <sup>s</sup> .7 <sup>s</sup> .6	4 <sup>s</sup> .70 <sup>s</sup> .09	35 <sup>s</sup> .3 <sup>s</sup> .0
20	7 <sup>s</sup> .13 <sup>s</sup> .14	45 <sup>s</sup> .0 <sup>s</sup> .1	8 <sup>s</sup> .07 <sup>s</sup> .15	49 <sup>s</sup> .3 <sup>s</sup> .6	4 <sup>s</sup> .79 <sup>s</sup> .14	35 <sup>s</sup> .3 <sup>s</sup> .1
30	7 <sup>s</sup> .27 <sup>s</sup> .18	46 <sup>s</sup> .1 <sup>s</sup> .1	8 <sup>s</sup> .22 <sup>s</sup> .17	49 <sup>s</sup> .9 <sup>s</sup> .7	4 <sup>s</sup> .93 <sup>s</sup> .17	35 <sup>s</sup> .4 <sup>s</sup> .2
July 10	7 <sup>s</sup> .45 <sup>s</sup> .20	47 <sup>s</sup> .2 <sup>s</sup> .1	8 <sup>s</sup> .39 <sup>s</sup> .20	50 <sup>s</sup> .6 <sup>s</sup> .7	5 <sup>s</sup> .10 <sup>s</sup> .20	35 <sup>s</sup> .6 <sup>s</sup> .2
20	7 <sup>s</sup> .65 <sup>s</sup> .23	48 <sup>s</sup> .3 <sup>s</sup> .1	8 <sup>s</sup> .59 <sup>s</sup> .23	51 <sup>s</sup> .3 <sup>s</sup> .7	5 <sup>s</sup> .30 <sup>s</sup> .23	35 <sup>s</sup> .8 <sup>s</sup> .3
30	7 <sup>s</sup> .88 <sup>s</sup> .25	49 <sup>s</sup> .4 <sup>s</sup> .0	8 <sup>s</sup> .82 <sup>s</sup> .25	52 <sup>s</sup> .0 <sup>s</sup> .6	5 <sup>s</sup> .53 <sup>s</sup> .25	36 <sup>s</sup> .1 <sup>s</sup> .1
Aug. 9	8 <sup>s</sup> .13 <sup>s</sup> .27	50 <sup>s</sup> .4 <sup>s</sup> .9	9 <sup>s</sup> .07 <sup>s</sup> .27	52 <sup>s</sup> .6 <sup>s</sup> .6	5 <sup>s</sup> .78 <sup>s</sup> .28	36 <sup>s</sup> .2 <sup>s</sup> .2
19	8 <sup>s</sup> .40 <sup>s</sup> .28	51 <sup>s</sup> .3 <sup>s</sup> .7	9 <sup>s</sup> .34 <sup>s</sup> .29	53 <sup>s</sup> .2 <sup>s</sup> .5	6 <sup>s</sup> .06 <sup>s</sup> .29	36 <sup>s</sup> .4 <sup>s</sup> .1
29	8 <sup>s</sup> .68 <sup>s</sup> .29	52 <sup>s</sup> .0 <sup>s</sup> .5	9 <sup>s</sup> .63 <sup>s</sup> .29	53 <sup>s</sup> .7 <sup>s</sup> .3	6 <sup>s</sup> .35 <sup>s</sup> .30	36 <sup>s</sup> .5 <sup>s</sup> .1
Sept. 8	8 <sup>s</sup> .97 <sup>s</sup> .29	52 <sup>s</sup> .5 <sup>s</sup> .3	9 <sup>s</sup> .92 <sup>s</sup> .30	54 <sup>s</sup> .0 <sup>s</sup> .2	6 <sup>s</sup> .65 <sup>s</sup> .31	36 <sup>s</sup> .6 <sup>s</sup> .1
18	9 <sup>s</sup> .26 <sup>s</sup> .29	52 <sup>s</sup> .8 <sup>s</sup> .1	10 <sup>s</sup> .22 <sup>s</sup> .30	54 <sup>s</sup> .2 <sup>s</sup> .1	6 <sup>s</sup> .96 <sup>s</sup> .32	36 <sup>s</sup> .7 <sup>s</sup> .1
28	9 <sup>s</sup> .55 <sup>s</sup> .29	52 <sup>s</sup> .9 <sup>s</sup> .1	10 <sup>s</sup> .52 <sup>s</sup> .30	54 <sup>s</sup> .3 <sup>s</sup> .1	7 <sup>s</sup> .28 <sup>s</sup> .32	36 <sup>s</sup> .6 <sup>s</sup> .1
Oct. 8	9 <sup>s</sup> .84 <sup>s</sup> .28	52 <sup>s</sup> .8 <sup>s</sup> .3	10 <sup>s</sup> .82 <sup>s</sup> .30	54 <sup>s</sup> .2 <sup>s</sup> .2	7 <sup>s</sup> .60 <sup>s</sup> .31	36 <sup>s</sup> .5 <sup>s</sup> .1
18	10 <sup>s</sup> .12 <sup>s</sup> .27	52 <sup>s</sup> .5 <sup>s</sup> .6	11 <sup>s</sup> .12 <sup>s</sup> .28	54 <sup>s</sup> .0 <sup>s</sup> .4	7 <sup>s</sup> .91 <sup>s</sup> .31	36 <sup>s</sup> .4 <sup>s</sup> .3
28	10 <sup>s</sup> .39 <sup>s</sup> .26	51 <sup>s</sup> .9 <sup>s</sup> .7	11 <sup>s</sup> .40 <sup>s</sup> .27	53 <sup>s</sup> .6 <sup>s</sup> .4	8 <sup>s</sup> .22 <sup>s</sup> .30	36 <sup>s</sup> .1 <sup>s</sup> .2
Nov. 7	10 <sup>s</sup> .65 <sup>s</sup> .24	51 <sup>s</sup> .2 <sup>s</sup> .8	11 <sup>s</sup> .67 <sup>s</sup> .26	53 <sup>s</sup> .2 <sup>s</sup> .5	8 <sup>s</sup> .52 <sup>s</sup> .28	35 <sup>s</sup> .9 <sup>s</sup> .3
17	10 <sup>s</sup> .89 <sup>s</sup> .21	50 <sup>s</sup> .4 <sup>s</sup> .9	11 <sup>s</sup> .93 <sup>s</sup> .23	52 <sup>s</sup> .7 <sup>s</sup> .6	8 <sup>s</sup> .80 <sup>s</sup> .25	35 <sup>s</sup> .6 <sup>s</sup> .2
27	11 <sup>s</sup> .10 <sup>s</sup> .18	49 <sup>s</sup> .5 <sup>s</sup> .9	12 <sup>s</sup> .16 <sup>s</sup> .20	52 <sup>s</sup> .1 <sup>s</sup> .6	9 <sup>s</sup> .05 <sup>s</sup> .22	35 <sup>s</sup> .4 <sup>s</sup> .2
Dec. 7	11 <sup>s</sup> .28 <sup>s</sup> .14	48 <sup>s</sup> .6 <sup>s</sup> .9	12 <sup>s</sup> .36 <sup>s</sup> .16	51 <sup>s</sup> .5 <sup>s</sup> .5	9 <sup>s</sup> .27 <sup>s</sup> .19	35 <sup>s</sup> .2 <sup>s</sup> .1
17	11 <sup>s</sup> .42 <sup>s</sup> .10	47 <sup>s</sup> .7 <sup>s</sup> .9	12 <sup>s</sup> .52 <sup>s</sup> .12	51 <sup>s</sup> .0 <sup>s</sup> .4	9 <sup>s</sup> .46 <sup>s</sup> .14	35 <sup>s</sup> .1 <sup>s</sup> .0
27	11 <sup>s</sup> .52 <sup>s</sup> .05	46 <sup>s</sup> .8 <sup>s</sup> .8	12 <sup>s</sup> .64 <sup>s</sup> .07	50 <sup>s</sup> .6 <sup>s</sup> .4	9 <sup>s</sup> .60 <sup>s</sup> .09	35 <sup>s</sup> .1 <sup>s</sup> .1
37	11 <sup>s</sup> .57 <sup>s</sup> .05	46 <sup>s</sup> .0 <sup>s</sup> .8	12 <sup>s</sup> .71 <sup>s</sup> .07	50 <sup>s</sup> .2 <sup>s</sup> .4	9 <sup>s</sup> .69 <sup>s</sup> .09	35 <sup>s</sup> .2 <sup>s</sup> .1



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Argus. (Canopus)		$\gamma$ Geminorum.		51 (Hev.) Cephei.							
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.						
	<sup>h</sup> 6	<sup>m</sup> 21	<sup>°</sup> 52	<sup>'</sup> 37	<sup>h</sup> 6	<sup>m</sup> 30	<sup>°</sup> 16	<sup>'</sup> 30	<sup>h</sup> 6	<sup>m</sup> 38	<sup>°</sup> 87	<sup>'</sup> 13
Jan. 1	5 <sup>s</sup> 97 <sup>s</sup>	0 <sup>s</sup> 04 <sup>s</sup>	39 <sup>s</sup> 0 <sup>s</sup>	12 <sup>s</sup> 50 <sup>s</sup>	22 <sup>s</sup> 9 <sup>s</sup>	59 <sup>s</sup> 10 <sup>s</sup>	77 <sup>s</sup> 5 <sup>s</sup>					
11	5 <sup>s</sup> 93 <sup>s</sup>	0 <sup>s</sup> 11 <sup>s</sup>	42 <sup>s</sup> 3 <sup>s</sup>	12 <sup>s</sup> 58 <sup>s</sup>	22 <sup>s</sup> 6 <sup>s</sup>	59 <sup>s</sup> 49 <sup>s</sup>	80 <sup>s</sup> 8 <sup>s</sup>					
21	5 <sup>s</sup> 82 <sup>s</sup>	0 <sup>s</sup> 17 <sup>s</sup>	45 <sup>s</sup> 4 <sup>s</sup>	12 <sup>s</sup> 61 <sup>s</sup>	22 <sup>s</sup> 4 <sup>s</sup>	58 <sup>s</sup> 96 <sup>s</sup>	84 <sup>s</sup> 1 <sup>s</sup>					
31	5 <sup>s</sup> 65 <sup>s</sup>	0 <sup>s</sup> 23 <sup>s</sup>	48 <sup>s</sup> 1 <sup>s</sup>	12 <sup>s</sup> 58 <sup>s</sup>	22 <sup>s</sup> 3 <sup>s</sup>	57 <sup>s</sup> 54 <sup>s</sup>	87 <sup>s</sup> 2 <sup>s</sup>					
Feb. 10	5 <sup>s</sup> 42 <sup>s</sup>	0 <sup>s</sup> 28 <sup>s</sup>	50 <sup>s</sup> 4 <sup>s</sup>	12 <sup>s</sup> 50 <sup>s</sup>	22 <sup>s</sup> 3 <sup>s</sup>	55 <sup>s</sup> 31 <sup>s</sup>	90 <sup>s</sup> 0 <sup>s</sup>					
20	5 <sup>s</sup> 14 <sup>s</sup>	0 <sup>s</sup> 33 <sup>s</sup>	52 <sup>s</sup> 3 <sup>s</sup>	12 <sup>s</sup> 39 <sup>s</sup>	22 <sup>s</sup> 4 <sup>s</sup>	52 <sup>s</sup> 36 <sup>s</sup>	92 <sup>s</sup> 4 <sup>s</sup>					
Mar. 2	4 <sup>s</sup> 81 <sup>s</sup>	0 <sup>s</sup> 35 <sup>s</sup>	53 <sup>s</sup> 7 <sup>s</sup>	12 <sup>s</sup> 25 <sup>s</sup>	22 <sup>s</sup> 5 <sup>s</sup>	48 <sup>s</sup> 82 <sup>s</sup>	94 <sup>s</sup> 3 <sup>s</sup>					
12	4 <sup>s</sup> 46 <sup>s</sup>	0 <sup>s</sup> 36 <sup>s</sup>	54 <sup>s</sup> 6 <sup>s</sup>	12 <sup>s</sup> 08 <sup>s</sup>	22 <sup>s</sup> 6 <sup>s</sup>	44 <sup>s</sup> 85 <sup>s</sup>	95 <sup>s</sup> 7 <sup>s</sup>					
22	4 <sup>s</sup> 10 <sup>s</sup>	0 <sup>s</sup> 36 <sup>s</sup>	55 <sup>s</sup> 0 <sup>s</sup>	11 <sup>s</sup> 90 <sup>s</sup>	22 <sup>s</sup> 8 <sup>s</sup>	40 <sup>s</sup> 63 <sup>s</sup>	96 <sup>s</sup> 5 <sup>s</sup>					
Apr. 1	3 <sup>s</sup> 74 <sup>s</sup>	0 <sup>s</sup> 35 <sup>s</sup>	54 <sup>s</sup> 8 <sup>s</sup>	11 <sup>s</sup> 71 <sup>s</sup>	23 <sup>s</sup> 0 <sup>s</sup>	36 <sup>s</sup> 32 <sup>s</sup>	96 <sup>s</sup> 7 <sup>s</sup>					
11	3 <sup>s</sup> 39 <sup>s</sup>	0 <sup>s</sup> 33 <sup>s</sup>	54 <sup>s</sup> 2 <sup>s</sup>	11 <sup>s</sup> 54 <sup>s</sup>	23 <sup>s</sup> 1 <sup>s</sup>	32 <sup>s</sup> 10 <sup>s</sup>	96 <sup>s</sup> 3 <sup>s</sup>					
21	3 <sup>s</sup> 06 <sup>s</sup>	0 <sup>s</sup> 29 <sup>s</sup>	53 <sup>s</sup> 0 <sup>s</sup>	11 <sup>s</sup> 39 <sup>s</sup>	23 <sup>s</sup> 3 <sup>s</sup>	28 <sup>s</sup> 15 <sup>s</sup>	95 <sup>s</sup> 3 <sup>s</sup>					
May 1	2 <sup>s</sup> 77 <sup>s</sup>	0 <sup>s</sup> 25 <sup>s</sup>	51 <sup>s</sup> 4 <sup>s</sup>	11 <sup>s</sup> 26 <sup>s</sup>	23 <sup>s</sup> 5 <sup>s</sup>	24 <sup>s</sup> 60 <sup>s</sup>	93 <sup>s</sup> 8 <sup>s</sup>					
11	2 <sup>s</sup> 52 <sup>s</sup>	0 <sup>s</sup> 20 <sup>s</sup>	49 <sup>s</sup> 3 <sup>s</sup>	11 <sup>s</sup> 16 <sup>s</sup>	23 <sup>s</sup> 7 <sup>s</sup>	21 <sup>s</sup> 58 <sup>s</sup>	91 <sup>s</sup> 8 <sup>s</sup>					
21	2 <sup>s</sup> 32 <sup>s</sup>	0 <sup>s</sup> 14 <sup>s</sup>	46 <sup>s</sup> 9 <sup>s</sup>	11 <sup>s</sup> 10 <sup>s</sup>	24 <sup>s</sup> 0 <sup>s</sup>	19 <sup>s</sup> 20 <sup>s</sup>	89 <sup>s</sup> 4 <sup>s</sup>					
31	2 <sup>s</sup> 18 <sup>s</sup>	0 <sup>s</sup> 09 <sup>s</sup>	44 <sup>s</sup> 1 <sup>s</sup>	11 <sup>s</sup> 09 <sup>s</sup>	24 <sup>s</sup> 3 <sup>s</sup>	17 <sup>s</sup> 52 <sup>s</sup>	86 <sup>s</sup> 8 <sup>s</sup>					
June 10	2 <sup>s</sup> 09 <sup>s</sup>	0 <sup>s</sup> 02 <sup>s</sup>	41 <sup>s</sup> 1 <sup>s</sup>	11 <sup>s</sup> 12 <sup>s</sup>	24 <sup>s</sup> 6 <sup>s</sup>	16 <sup>s</sup> 60 <sup>s</sup>	83 <sup>s</sup> 9 <sup>s</sup>					
20	2 <sup>s</sup> 07 <sup>s</sup>	0 <sup>s</sup> 05 <sup>s</sup>	37 <sup>s</sup> 9 <sup>s</sup>	11 <sup>s</sup> 18 <sup>s</sup>	25 <sup>s</sup> 0 <sup>s</sup>	16 <sup>s</sup> 45 <sup>s</sup>	80 <sup>s</sup> 9 <sup>s</sup>					
30	2 <sup>s</sup> 12 <sup>s</sup>	0 <sup>s</sup> 10 <sup>s</sup>	34 <sup>s</sup> 2 <sup>s</sup>	11 <sup>s</sup> 29 <sup>s</sup>	25 <sup>s</sup> 5 <sup>s</sup>	15 <sup>s</sup> 22 <sup>s</sup>	77 <sup>s</sup> 1 <sup>s</sup>					
July 10	2 <sup>s</sup> 22 <sup>s</sup>	0 <sup>s</sup> 16 <sup>s</sup>	30 <sup>s</sup> 9 <sup>s</sup>	11 <sup>s</sup> 45 <sup>s</sup>	25 <sup>s</sup> 9 <sup>s</sup>	18 <sup>s</sup> 68 <sup>s</sup>	74 <sup>s</sup> 6 <sup>s</sup>					
20	2 <sup>s</sup> 38 <sup>s</sup>	0 <sup>s</sup> 22 <sup>s</sup>	27 <sup>s</sup> 6 <sup>s</sup>	11 <sup>s</sup> 63 <sup>s</sup>	26 <sup>s</sup> 3 <sup>s</sup>	20 <sup>s</sup> 88 <sup>s</sup>	71 <sup>s</sup> 7 <sup>s</sup>					
30	2 <sup>s</sup> 60 <sup>s</sup>	0 <sup>s</sup> 26 <sup>s</sup>	24 <sup>s</sup> 5 <sup>s</sup>	11 <sup>s</sup> 84 <sup>s</sup>	26 <sup>s</sup> 8 <sup>s</sup>	23 <sup>s</sup> 77 <sup>s</sup>	69 <sup>s</sup> 0 <sup>s</sup>					
Aug. 9	2 <sup>s</sup> 86 <sup>s</sup>	0 <sup>s</sup> 31 <sup>s</sup>	21 <sup>s</sup> 7 <sup>s</sup>	12 <sup>s</sup> 07 <sup>s</sup>	27 <sup>s</sup> 2 <sup>s</sup>	27 <sup>s</sup> 26 <sup>s</sup>	66 <sup>s</sup> 5 <sup>s</sup>					
19	3 <sup>s</sup> 17 <sup>s</sup>	0 <sup>s</sup> 35 <sup>s</sup>	19 <sup>s</sup> 3 <sup>s</sup>	12 <sup>s</sup> 32 <sup>s</sup>	27 <sup>s</sup> 6 <sup>s</sup>	31 <sup>s</sup> 30 <sup>s</sup>	64 <sup>s</sup> 4 <sup>s</sup>					
29	3 <sup>s</sup> 52 <sup>s</sup>	0 <sup>s</sup> 37 <sup>s</sup>	17 <sup>s</sup> 3 <sup>s</sup>	12 <sup>s</sup> 59 <sup>s</sup>	27 <sup>s</sup> 8 <sup>s</sup>	35 <sup>s</sup> 79 <sup>s</sup>	62 <sup>s</sup> 6 <sup>s</sup>					
Sept. 8	3 <sup>s</sup> 89 <sup>s</sup>	0 <sup>s</sup> 39 <sup>s</sup>	15 <sup>s</sup> 8 <sup>s</sup>	12 <sup>s</sup> 88 <sup>s</sup>	28 <sup>s</sup> 0 <sup>s</sup>	40 <sup>s</sup> 66 <sup>s</sup>	61 <sup>s</sup> 2 <sup>s</sup>					
18	4 <sup>s</sup> 28 <sup>s</sup>	0 <sup>s</sup> 40 <sup>s</sup>	15 <sup>s</sup> 0 <sup>s</sup>	13 <sup>s</sup> 18 <sup>s</sup>	28 <sup>s</sup> 0 <sup>s</sup>	45 <sup>s</sup> 80 <sup>s</sup>	60 <sup>s</sup> 3 <sup>s</sup>					
28	4 <sup>s</sup> 68 <sup>s</sup>	0 <sup>s</sup> 41 <sup>s</sup>	14 <sup>s</sup> 8 <sup>s</sup>	13 <sup>s</sup> 48 <sup>s</sup>	27 <sup>s</sup> 9 <sup>s</sup>	51 <sup>s</sup> 13 <sup>s</sup>	59 <sup>s</sup> 7 <sup>s</sup>					
Oct. 8	5 <sup>s</sup> 09 <sup>s</sup>	0 <sup>s</sup> 40 <sup>s</sup>	15 <sup>s</sup> 2 <sup>s</sup>	13 <sup>s</sup> 79 <sup>s</sup>	27 <sup>s</sup> 6 <sup>s</sup>	56 <sup>s</sup> 53 <sup>s</sup>	59 <sup>s</sup> 7 <sup>s</sup>					
18	5 <sup>s</sup> 49 <sup>s</sup>	0 <sup>s</sup> 38 <sup>s</sup>	16 <sup>s</sup> 2 <sup>s</sup>	14 <sup>s</sup> 09 <sup>s</sup>	27 <sup>s</sup> 3 <sup>s</sup>	61 <sup>s</sup> 89 <sup>s</sup>	60 <sup>s</sup> 1 <sup>s</sup>					
28	5 <sup>s</sup> 87 <sup>s</sup>	0 <sup>s</sup> 35 <sup>s</sup>	17 <sup>s</sup> 8 <sup>s</sup>	14 <sup>s</sup> 40 <sup>s</sup>	26 <sup>s</sup> 8 <sup>s</sup>	67 <sup>s</sup> 10 <sup>s</sup>	61 <sup>s</sup> 0 <sup>s</sup>					
Nov. 7	6 <sup>s</sup> 22 <sup>s</sup>	0 <sup>s</sup> 31 <sup>s</sup>	20 <sup>s</sup> 0 <sup>s</sup>	14 <sup>s</sup> 69 <sup>s</sup>	26 <sup>s</sup> 2 <sup>s</sup>	72 <sup>s</sup> 03 <sup>s</sup>	62 <sup>s</sup> 4 <sup>s</sup>					
17	6 <sup>s</sup> 53 <sup>s</sup>	0 <sup>s</sup> 26 <sup>s</sup>	22 <sup>s</sup> 7 <sup>s</sup>	14 <sup>s</sup> 97 <sup>s</sup>	25 <sup>s</sup> 6 <sup>s</sup>	76 <sup>s</sup> 55 <sup>s</sup>	64 <sup>s</sup> 3 <sup>s</sup>					
27	6 <sup>s</sup> 79 <sup>s</sup>	0 <sup>s</sup> 21 <sup>s</sup>	25 <sup>s</sup> 7 <sup>s</sup>	15 <sup>s</sup> 22 <sup>s</sup>	25 <sup>s</sup> 0 <sup>s</sup>	80 <sup>s</sup> 56 <sup>s</sup>	66 <sup>s</sup> 6 <sup>s</sup>					
Dec. 7	7 <sup>s</sup> 00 <sup>s</sup>	0 <sup>s</sup> 14 <sup>s</sup>	29 <sup>s</sup> 0 <sup>s</sup>	15 <sup>s</sup> 45 <sup>s</sup>	24 <sup>s</sup> 4 <sup>s</sup>	83 <sup>s</sup> 92 <sup>s</sup>	69 <sup>s</sup> 2 <sup>s</sup>					
17	7 <sup>s</sup> 14 <sup>s</sup>	0 <sup>s</sup> 08 <sup>s</sup>	32 <sup>s</sup> 5 <sup>s</sup>	15 <sup>s</sup> 64 <sup>s</sup>	23 <sup>s</sup> 9 <sup>s</sup>	86 <sup>s</sup> 54 <sup>s</sup>	72 <sup>s</sup> 2 <sup>s</sup>					
27	7 <sup>s</sup> 22 <sup>s</sup>	0 <sup>s</sup> 00 <sup>s</sup>	36 <sup>s</sup> 0 <sup>s</sup>	15 <sup>s</sup> 79 <sup>s</sup>	23 <sup>s</sup> 5 <sup>s</sup>	88 <sup>s</sup> 33 <sup>s</sup>	75 <sup>s</sup> 4 <sup>s</sup>					
37	7 <sup>s</sup> 22 <sup>s</sup>	0 <sup>s</sup> 00 <sup>s</sup>	39 <sup>s</sup> 4 <sup>s</sup>	15 <sup>s</sup> 90 <sup>s</sup>	23 <sup>s</sup> 2 <sup>s</sup>	89 <sup>s</sup> 24 <sup>s</sup>	78 <sup>s</sup> 7 <sup>s</sup>					



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Canis Majoris. (Sirius)		$\epsilon$ Canis Majoris.		$\gamma$ Canis Majoris.			
	R. A.	Dec. South.	R. A.	Dec. South.	R. A.	Dec. South.		
	<sup>h</sup> 6	<sup>m</sup> 39	<sup>°</sup> 16	<sup>'</sup> 32	<sup>h</sup> 6	<sup>m</sup> 57	<sup>°</sup> 15	<sup>'</sup> 26
Jan. I	25 <sup>s</sup> .94	0 <sup>s</sup> .06	30 <sup>s</sup> .1	1 <sup>s</sup> .2	31 <sup>s</sup> .94	0 <sup>s</sup> .06	54 <sup>s</sup> .5	2 <sup>s</sup> .8
II	26 <sup>s</sup> .00	0 <sup>s</sup> .01	32 <sup>s</sup> .3	2 <sup>s</sup> .1	32 <sup>s</sup> .00	0 <sup>s</sup> .00	57 <sup>s</sup> .3	2 <sup>s</sup> .6
2I	26 <sup>s</sup> .01	0 <sup>s</sup> .05	34 <sup>s</sup> .4	1 <sup>s</sup> .8	32 <sup>s</sup> .00	0 <sup>s</sup> .05	59 <sup>s</sup> .9	2 <sup>s</sup> .4
3I	25 <sup>s</sup> .96	0 <sup>s</sup> .09	36 <sup>s</sup> .2	1 <sup>s</sup> .5	31 <sup>s</sup> .95	0 <sup>s</sup> .10	62 <sup>s</sup> .3	2 <sup>s</sup> .1
Feb. 10	25 <sup>s</sup> .87	0 <sup>s</sup> .12	37 <sup>s</sup> .7	1 <sup>s</sup> .3	31 <sup>s</sup> .85	0 <sup>s</sup> .14	64 <sup>s</sup> .4	1 <sup>s</sup> .7
20	25 <sup>s</sup> .75	0 <sup>s</sup> .16	39 <sup>s</sup> .0	0 <sup>s</sup> .9	31 <sup>s</sup> .71	0 <sup>s</sup> .18	66 <sup>s</sup> .1	1 <sup>s</sup> .3
Mar. 2	25 <sup>s</sup> .59	0 <sup>s</sup> .18	39 <sup>s</sup> .9	0 <sup>s</sup> .6	31 <sup>s</sup> .53	0 <sup>s</sup> .20	67 <sup>s</sup> .4	1 <sup>s</sup> .0
12	25 <sup>s</sup> .41	0 <sup>s</sup> .20	40 <sup>s</sup> .5	0 <sup>s</sup> .3	31 <sup>s</sup> .33	0 <sup>s</sup> .21	68 <sup>s</sup> .4	0 <sup>s</sup> .5
22	25 <sup>s</sup> .21	0 <sup>s</sup> .20	40 <sup>s</sup> .8	0 <sup>s</sup> .0	31 <sup>s</sup> .12	0 <sup>s</sup> .23	68 <sup>s</sup> .9	0 <sup>s</sup> .1
Apr. I	25 <sup>s</sup> .01	0 <sup>s</sup> .19	40 <sup>s</sup> .8	0 <sup>s</sup> .4	30 <sup>s</sup> .89	0 <sup>s</sup> .22	69 <sup>s</sup> .0	0 <sup>s</sup> .3
II	24 <sup>s</sup> .82	0 <sup>s</sup> .17	40 <sup>s</sup> .4	0 <sup>s</sup> .6	30 <sup>s</sup> .67	0 <sup>s</sup> .20	68 <sup>s</sup> .7	0 <sup>s</sup> .7
2I	24 <sup>s</sup> .65	0 <sup>s</sup> .15	39 <sup>s</sup> .8	1 <sup>s</sup> .0	30 <sup>s</sup> .47	0 <sup>s</sup> .18	68 <sup>s</sup> .0	1 <sup>s</sup> .1
May I	24 <sup>s</sup> .50	0 <sup>s</sup> .12	38 <sup>s</sup> .8	1 <sup>s</sup> .3	30 <sup>s</sup> .29	0 <sup>s</sup> .16	66 <sup>s</sup> .9	1 <sup>s</sup> .4
II	24 <sup>s</sup> .38	0 <sup>s</sup> .09	37 <sup>s</sup> .5	1 <sup>s</sup> .5	30 <sup>s</sup> .13	0 <sup>s</sup> .12	65 <sup>s</sup> .5	1 <sup>s</sup> .8
2I	24 <sup>s</sup> .29	0 <sup>s</sup> .05	36 <sup>s</sup> .0	1 <sup>s</sup> .6	30 <sup>s</sup> .01	0 <sup>s</sup> .08	63 <sup>s</sup> .7	2 <sup>s</sup> .0
3I	24 <sup>s</sup> .24	0 <sup>s</sup> .00	34 <sup>s</sup> .4	1 <sup>s</sup> .9	29 <sup>s</sup> .93	0 <sup>s</sup> .04	61 <sup>s</sup> .7	2 <sup>s</sup> .3
June 10	24 <sup>s</sup> .24	0 <sup>s</sup> .03	32 <sup>s</sup> .5	2 <sup>s</sup> .0	29 <sup>s</sup> .89	0 <sup>s</sup> .00	59 <sup>s</sup> .4	2 <sup>s</sup> .5
20	24 <sup>s</sup> .27	0 <sup>s</sup> .07	30 <sup>s</sup> .5	2 <sup>s</sup> .2	29 <sup>s</sup> .89	0 <sup>s</sup> .04	56 <sup>s</sup> .9	2 <sup>s</sup> .6
30	{24 <sup>s</sup> .34}	0 <sup>s</sup> .11	{28 <sup>s</sup> .1}	2 <sup>s</sup> .1	29 <sup>s</sup> .93	0 <sup>s</sup> .10	54 <sup>s</sup> .3	2 <sup>s</sup> .9
July 10	24 <sup>s</sup> .45	0 <sup>s</sup> .15	26 <sup>s</sup> .0	2 <sup>s</sup> .2	30 <sup>s</sup> .03	0 <sup>s</sup> .12	51 <sup>s</sup> .4	2 <sup>s</sup> .6
20	24 <sup>s</sup> .60	0 <sup>s</sup> .17	23 <sup>s</sup> .8	2 <sup>s</sup> .0	30 <sup>s</sup> .15	0 <sup>s</sup> .16	48 <sup>s</sup> .8	2 <sup>s</sup> .5
30	24 <sup>s</sup> .77	0 <sup>s</sup> .20	21 <sup>s</sup> .8	1 <sup>s</sup> .8	30 <sup>s</sup> .31	0 <sup>s</sup> .19	46 <sup>s</sup> .3	2 <sup>s</sup> .4
Aug. 9	24 <sup>s</sup> .97	0 <sup>s</sup> .23	20 <sup>s</sup> .0	1 <sup>s</sup> .6	30 <sup>s</sup> .50	0 <sup>s</sup> .22	43 <sup>s</sup> .9	2 <sup>s</sup> .0
19	25 <sup>s</sup> .20	0 <sup>s</sup> .25	18 <sup>s</sup> .4	1 <sup>s</sup> .4	30 <sup>s</sup> .72	0 <sup>s</sup> .25	41 <sup>s</sup> .9	1 <sup>s</sup> .7
29	25 <sup>s</sup> .45	0 <sup>s</sup> .26	17 <sup>s</sup> .0	0 <sup>s</sup> .9	30 <sup>s</sup> .97	0 <sup>s</sup> .27	40 <sup>s</sup> .2	1 <sup>s</sup> .3
Sept. 8	25 <sup>s</sup> .71	0 <sup>s</sup> .28	16 <sup>s</sup> .1	0 <sup>s</sup> .5	31 <sup>s</sup> .24	0 <sup>s</sup> .29	38 <sup>s</sup> .9	0 <sup>s</sup> .9
18	25 <sup>s</sup> .99	0 <sup>s</sup> .29	15 <sup>s</sup> .6	0 <sup>s</sup> .1	31 <sup>s</sup> .53	0 <sup>s</sup> .30	38 <sup>s</sup> .0	0 <sup>s</sup> .4
28	26 <sup>s</sup> .28	0 <sup>s</sup> .29	15 <sup>s</sup> .5	0 <sup>s</sup> .3	31 <sup>s</sup> .83	0 <sup>s</sup> .31	37 <sup>s</sup> .6	0 <sup>s</sup> .2
Oct. 8	26 <sup>s</sup> .57	0 <sup>s</sup> .29	15 <sup>s</sup> .8	0 <sup>s</sup> .8	32 <sup>s</sup> .14	0 <sup>s</sup> .31	37 <sup>s</sup> .8	0 <sup>s</sup> .8
18	26 <sup>s</sup> .86	0 <sup>s</sup> .29	16 <sup>s</sup> .6	1 <sup>s</sup> .2	32 <sup>s</sup> .45	0 <sup>s</sup> .31	38 <sup>s</sup> .6	1 <sup>s</sup> .2
28	27 <sup>s</sup> .15	0 <sup>s</sup> .27	17 <sup>s</sup> .8	1 <sup>s</sup> .6	32 <sup>s</sup> .76	0 <sup>s</sup> .30	39 <sup>s</sup> .8	1 <sup>s</sup> .7
Nov. 7	27 <sup>s</sup> .42	0 <sup>s</sup> .26	19 <sup>s</sup> .4	1 <sup>s</sup> .9	33 <sup>s</sup> .06	0 <sup>s</sup> .28	41 <sup>s</sup> .5	2 <sup>s</sup> .1
17	27 <sup>s</sup> .68	0 <sup>s</sup> .24	21 <sup>s</sup> .3	2 <sup>s</sup> .1	33 <sup>s</sup> .34	0 <sup>s</sup> .25	43 <sup>s</sup> .6	2 <sup>s</sup> .5
27	27 <sup>s</sup> .92	0 <sup>s</sup> .21	23 <sup>s</sup> .4	2 <sup>s</sup> .3	33 <sup>s</sup> .59	0 <sup>s</sup> .22	46 <sup>s</sup> .1	2 <sup>s</sup> .8
Dec. 7	28 <sup>s</sup> .13	0 <sup>s</sup> .17	25 <sup>s</sup> .7	2 <sup>s</sup> .4	33 <sup>s</sup> .81	0 <sup>s</sup> .19	48 <sup>s</sup> .9	2 <sup>s</sup> .8
17	28 <sup>s</sup> .30	0 <sup>s</sup> .13	28 <sup>s</sup> .1	2 <sup>s</sup> .4	34 <sup>s</sup> .00	0 <sup>s</sup> .13	51 <sup>s</sup> .7	2 <sup>s</sup> .9
27	28 <sup>s</sup> .43	0 <sup>s</sup> .09	30 <sup>s</sup> .5	2 <sup>s</sup> .3	34 <sup>s</sup> .13	0 <sup>s</sup> .09	54 <sup>s</sup> .6	2 <sup>s</sup> .9
37	28 <sup>s</sup> .52	0 <sup>s</sup> .09	32 <sup>s</sup> .8	2 <sup>s</sup> .3	34 <sup>s</sup> .22	0 <sup>s</sup> .09	57 <sup>s</sup> .5	2 <sup>s</sup> .9
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## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\delta$ Geminorum.		$\alpha$ Geminorum. (Castor)		$\alpha$ Canis Minoris. (Procyon)	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 7	<sup>m</sup> 12	<sup>°</sup> 22	<sup>'</sup> 13	<sup>h</sup> 7	<sup>m</sup> 32
	<sup>°</sup> 1	<sup>'</sup> 12	<sup>°</sup> 32	<sup>'</sup> 13	<sup>°</sup> 5	<sup>'</sup> 33
Jan. 1	21 <sup>s</sup> 86 <sup>s</sup>	3 <sup>s</sup> 2 <sup>s</sup>	18 <sup>s</sup> 54 <sup>s</sup>	9 <sup>s</sup> 0 <sup>s</sup>	30 <sup>s</sup> 09 <sup>s</sup>	18 <sup>s</sup> 1 <sup>s</sup>
11	21 <sup>s</sup> 98 <sup>s</sup>	3 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup>	18 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 15	9 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 6	30 <sup>s</sup> 21 <sup>s</sup> 0 <sup>s</sup> 12	16 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 2
21	22 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 06	3 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 1	18 <sup>s</sup> 78 <sup>s</sup> 0 <sup>s</sup> 09	10 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 6	30 <sup>s</sup> 29 <sup>s</sup> 0 <sup>s</sup> 08	15 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 0
31	22 <sup>s</sup> 06 <sup>s</sup> 0 <sup>s</sup> 02	3 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 2	18 <sup>s</sup> 81 <sup>s</sup> 0 <sup>s</sup> 03	11 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 8	30 <sup>s</sup> 32 <sup>s</sup> 0 <sup>s</sup> 03	15 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 8
	0 <sup>s</sup> 04	0 <sup>s</sup> 3	0 <sup>s</sup> 03	0 <sup>s</sup> 9	0 <sup>s</sup> 02	0 <sup>s</sup> 7
Feb. 10	22 <sup>s</sup> 02 <sup>s</sup> 0 <sup>s</sup> 08	3 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 4	18 <sup>s</sup> 78 <sup>s</sup> 0 <sup>s</sup> 08	11 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 9	30 <sup>s</sup> 30 <sup>s</sup> 0 <sup>s</sup> 07	14 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 5
20	21 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 12	4 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 4	18 <sup>s</sup> 70 <sup>s</sup> 0 <sup>s</sup> 12	12 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 8	30 <sup>s</sup> 23 <sup>s</sup> 0 <sup>s</sup> 11	13 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 3
Mar. 2	21 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 15	4 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 4	18 <sup>s</sup> 58 <sup>s</sup> 0 <sup>s</sup> 16	13 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 8	30 <sup>s</sup> 12 <sup>s</sup> 0 <sup>s</sup> 14	13 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 1
12	21 <sup>s</sup> 67 <sup>s</sup> 0 <sup>s</sup> 18	5 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 4	18 <sup>s</sup> 42 <sup>s</sup> 0 <sup>s</sup> 19	14 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 98 <sup>s</sup> 0 <sup>s</sup> 16	13 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 0
	0 <sup>s</sup> 19	5 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 3	18 <sup>s</sup> 23 <sup>s</sup> 0 <sup>s</sup> 20	15 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 5	29 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 17	13 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 1
Apr. 1	21 <sup>s</sup> 30 <sup>s</sup> 0 <sup>s</sup> 18	5 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 3	18 <sup>s</sup> 03 <sup>s</sup> 0 <sup>s</sup> 20	15 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 4	29 <sup>s</sup> 65 <sup>s</sup> 0 <sup>s</sup> 17	13 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 3
11	21 <sup>s</sup> 12 <sup>s</sup> 0 <sup>s</sup> 17	6 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 3	17 <sup>s</sup> 83 <sup>s</sup> 0 <sup>s</sup> 19	16 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 2	29 <sup>s</sup> 48 <sup>s</sup> 0 <sup>s</sup> 16	13 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 3
21	20 <sup>s</sup> 95 <sup>s</sup> 0 <sup>s</sup> 15	6 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 1	17 <sup>s</sup> 64 <sup>s</sup> 0 <sup>s</sup> 16	16 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 1	29 <sup>s</sup> 32 <sup>s</sup> 0 <sup>s</sup> 15	14 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 5
	0 <sup>s</sup> 12	6 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 1	17 <sup>s</sup> 48 <sup>s</sup> 0 <sup>s</sup> 14	16 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 1	29 <sup>s</sup> 17 <sup>s</sup> 0 <sup>s</sup> 12	14 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 5
May 1	20 <sup>s</sup> 80 <sup>s</sup> 0 <sup>s</sup> 09	6 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 1	17 <sup>s</sup> 34 <sup>s</sup> 0 <sup>s</sup> 11	16 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 3	29 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 10	15 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 6
11	20 <sup>s</sup> 68 <sup>s</sup> 0 <sup>s</sup> 04	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 23 <sup>s</sup> 0 <sup>s</sup> 07	15 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 4	28 <sup>s</sup> 95 <sup>s</sup> 0 <sup>s</sup> 06	15 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 7
21	20 <sup>s</sup> 59 <sup>s</sup> 0 <sup>s</sup> 01	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 16 <sup>s</sup> 0 <sup>s</sup> 03	15 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 5	28 <sup>s</sup> 89 <sup>s</sup> 0 <sup>s</sup> 03	16 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 8
31	20 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 03	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 13 <sup>s</sup> 0 <sup>s</sup> 02	15 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 6	28 <sup>s</sup> 86 <sup>s</sup> 0 <sup>s</sup> 00	17 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 8
June 10	20 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 07	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 15 <sup>s</sup> 0 <sup>s</sup> 07	14 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 6	28 <sup>s</sup> 86 <sup>s</sup> 0 <sup>s</sup> 04	18 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 9
20	20 <sup>s</sup> 57 <sup>s</sup> 0 <sup>s</sup> 12	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 22 <sup>s</sup> 0 <sup>s</sup> 10	13 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 6	28 <sup>s</sup> 90 <sup>s</sup> 0 <sup>s</sup> 08	19 <sup>s</sup> 0 <sup>s</sup> 8
30	20 <sup>s</sup> 64 <sup>s</sup> 0 <sup>s</sup> 15	6 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 0	17 <sup>s</sup> 32 <sup>s</sup> 0 <sup>s</sup> 15	13 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 8	28 <sup>s</sup> 98 <sup>s</sup> 0 <sup>s</sup> 12	19 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 0
July 10	20 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 17	6 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 1	17 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 18	12 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 10 <sup>s</sup> 0 <sup>s</sup> 14	20 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 8
20	21 <sup>s</sup> 08 <sup>s</sup> 0 <sup>s</sup> 21	6 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 1	17 <sup>s</sup> 65 <sup>s</sup> 0 <sup>s</sup> 21	11 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 24 <sup>s</sup> 0 <sup>s</sup> 17	21 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 7
30	21 <sup>s</sup> 29 <sup>s</sup> 0 <sup>s</sup> 23	6 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 2	17 <sup>s</sup> 86 <sup>s</sup> 0 <sup>s</sup> 24	11 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 41 <sup>s</sup> 0 <sup>s</sup> 19	22 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 5
Aug. 9	21 <sup>s</sup> 52 <sup>s</sup> 0 <sup>s</sup> 26	6 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 3	18 <sup>s</sup> 10 <sup>s</sup> 0 <sup>s</sup> 27	10 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 60 <sup>s</sup> 0 <sup>s</sup> 22	22 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 4
19	21 <sup>s</sup> 78 <sup>s</sup> 0 <sup>s</sup> 27	5 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 3	18 <sup>s</sup> 37 <sup>s</sup> 0 <sup>s</sup> 29	9 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 23	23 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 2
29	22 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 29	5 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 4	18 <sup>s</sup> 66 <sup>s</sup> 0 <sup>s</sup> 31	9 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 8	30 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 26	23 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 0
Sept. 8	22 <sup>s</sup> 34 <sup>s</sup> 0 <sup>s</sup> 31	5 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 6	18 <sup>s</sup> 97 <sup>s</sup> 0 <sup>s</sup> 33	8 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 7	30 <sup>s</sup> 31 <sup>s</sup> 0 <sup>s</sup> 27	23 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 2
18	22 <sup>s</sup> 65 <sup>s</sup> 0 <sup>s</sup> 31	4 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 6	19 <sup>s</sup> 30 <sup>s</sup> 0 <sup>s</sup> 34	7 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 7	30 <sup>s</sup> 58 <sup>s</sup> 0 <sup>s</sup> 29	23 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 5
28	23 <sup>s</sup> 29 <sup>s</sup> 0 <sup>s</sup> 33	3 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 6	19 <sup>s</sup> 98 <sup>s</sup> 0 <sup>s</sup> 36	6 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 7	31 <sup>s</sup> 17 <sup>s</sup> 0 <sup>s</sup> 30	21 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 0
Oct. 8	23 <sup>s</sup> 61 <sup>s</sup> 0 <sup>s</sup> 33	3 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 7	20 <sup>s</sup> 34 <sup>s</sup> 0 <sup>s</sup> 36	5 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 6	31 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 30	20 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 1
18	23 <sup>s</sup> 94 <sup>s</sup> 0 <sup>s</sup> 31	1 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 6	21 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 35	4 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 3	32 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 28	18 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 4
28	24 <sup>s</sup> 25 <sup>s</sup> 0 <sup>s</sup> 30	1 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 5	21 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 31	4 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 1	32 <sup>s</sup> 35 <sup>s</sup> 0 <sup>s</sup> 26	17 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 4
Nov. 7	24 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 27	0 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 4	21 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 27	4 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 1	32 <sup>s</sup> 61 <sup>s</sup> 0 <sup>s</sup> 23	15 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 5
17	25 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 20	0 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 3	21 <sup>s</sup> 96 <sup>s</sup> 0 <sup>s</sup> 23	4 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 2	32 <sup>s</sup> 84 <sup>s</sup> 0 <sup>s</sup> 20	14 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 3
27	25 <sup>s</sup> 25 <sup>s</sup> 0 <sup>s</sup> 16	0 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 1	22 <sup>s</sup> 19 <sup>s</sup> 0 <sup>s</sup> 17	4 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 4	33 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 15	12 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 3
Dec. 7	25 <sup>s</sup> 41 <sup>s</sup> 0 <sup>s</sup> 12	0 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 1	22 <sup>s</sup> 36 <sup>s</sup> 0 <sup>s</sup> 17	4 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 4	33 <sup>s</sup> 19 <sup>s</sup> 0 <sup>s</sup> 15	11 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 3
17						
27						
37						



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Geminorum. (Pollux)		6 Cancr.		15 Argus.							
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. South.						
	<sup>h</sup> 7	<sup>m</sup> 37	<sup>°</sup> 28	<sup>'</sup> 20	<sup>h</sup> 7	<sup>m</sup> 55	<sup>°</sup> 28	<sup>'</sup> 9	<sup>h</sup> 8	<sup>m</sup> 1	<sup>°</sup> 23	<sup>'</sup> 55
Jan. 1	21 <sup>s</sup> .82	9 <sup>s</sup> .6	32 <sup>s</sup> .21	17 <sup>s</sup> .3	61 <sup>s</sup> .22	52 <sup>s</sup> .0						
11	21 <sup>s</sup> .97	9 <sup>s</sup> .9	32 <sup>s</sup> .38	17 <sup>s</sup> .5	61 <sup>s</sup> .35	54 <sup>s</sup> .8						
21	22 <sup>s</sup> .07	10 <sup>s</sup> .4	32 <sup>s</sup> .50	17 <sup>s</sup> .9	61 <sup>s</sup> .43	57 <sup>s</sup> .4						
31	22 <sup>s</sup> .11	10 <sup>s</sup> .9	32 <sup>s</sup> .56	18 <sup>s</sup> .4	61 <sup>s</sup> .46	59 <sup>s</sup> .9						
	0 <sup>s</sup> .01	0 <sup>s</sup> .7	0 <sup>s</sup> .01	0 <sup>s</sup> .6	0 <sup>s</sup> .02	2 <sup>s</sup> .3						
Feb. 10	22 <sup>s</sup> .10	11 <sup>s</sup> .6	32 <sup>s</sup> .57	19 <sup>s</sup> .0	61 <sup>s</sup> .44	62 <sup>s</sup> .2						
20	22 <sup>s</sup> .03	12 <sup>s</sup> .3	32 <sup>s</sup> .52	19 <sup>s</sup> .8	61 <sup>s</sup> .37	64 <sup>s</sup> .1						
Mar. 2	21 <sup>s</sup> .92	13 <sup>s</sup> .0	32 <sup>s</sup> .43	20 <sup>s</sup> .6	61 <sup>s</sup> .26	65 <sup>s</sup> .8						
12	21 <sup>s</sup> .78	13 <sup>s</sup> .8	32 <sup>s</sup> .30	21 <sup>s</sup> .3	61 <sup>s</sup> .11	67 <sup>s</sup> .1						
	0 <sup>s</sup> .18	0 <sup>s</sup> .6	0 <sup>s</sup> .17	0 <sup>s</sup> .8	0 <sup>s</sup> .17	0 <sup>s</sup> .9						
22	21 <sup>s</sup> .60	14 <sup>s</sup> .4	32 <sup>s</sup> .13	22 <sup>s</sup> .1	60 <sup>s</sup> .94	68 <sup>s</sup> .0						
Apr. 1	21 <sup>s</sup> .41	15 <sup>s</sup> .0	31 <sup>s</sup> .95	22 <sup>s</sup> .7	60 <sup>s</sup> .75	68 <sup>s</sup> .6						
11	21 <sup>s</sup> .22	15 <sup>s</sup> .4	31 <sup>s</sup> .77	23 <sup>s</sup> .2	60 <sup>s</sup> .56	68 <sup>s</sup> .8						
21	21 <sup>s</sup> .04	15 <sup>s</sup> .7	31 <sup>s</sup> .59	23 <sup>s</sup> .6	60 <sup>s</sup> .36	68 <sup>s</sup> .6						
	0 <sup>s</sup> .17	0 <sup>s</sup> .1	0 <sup>s</sup> .17	0 <sup>s</sup> .3	0 <sup>s</sup> .18	0 <sup>s</sup> .5						
May 1	20 <sup>s</sup> .87	15 <sup>s</sup> .8	31 <sup>s</sup> .42	23 <sup>s</sup> .9	60 <sup>s</sup> .18	68 <sup>s</sup> .1						
11	20 <sup>s</sup> .73	15 <sup>s</sup> .9	31 <sup>s</sup> .27	24 <sup>s</sup> .0	60 <sup>s</sup> .02	67 <sup>s</sup> .3						
21	20 <sup>s</sup> .62	15 <sup>s</sup> .8	31 <sup>s</sup> .16	24 <sup>s</sup> .0	59 <sup>s</sup> .88	66 <sup>s</sup> .1						
31	20 <sup>s</sup> .55	15 <sup>s</sup> .6	31 <sup>s</sup> .07	23 <sup>s</sup> .9	59 <sup>s</sup> .76	64 <sup>s</sup> .7						
	0 <sup>s</sup> .03	0 <sup>s</sup> .2	0 <sup>s</sup> .04	0 <sup>s</sup> .2	0 <sup>s</sup> .08	1 <sup>s</sup> .7						
June 10	20 <sup>s</sup> .52	15 <sup>s</sup> .4	31 <sup>s</sup> .03	23 <sup>s</sup> .7	59 <sup>s</sup> .68	63 <sup>s</sup> .0						
20	20 <sup>s</sup> .52	15 <sup>s</sup> .0	31 <sup>s</sup> .02	23 <sup>s</sup> .3	59 <sup>s</sup> .63	61 <sup>s</sup> .1						
30	20 <sup>s</sup> .57	14 <sup>s</sup> .6	31 <sup>s</sup> .05	23 <sup>s</sup> .0	59 <sup>s</sup> .61	59 <sup>s</sup> .0						
July 10	20 <sup>s</sup> .66	14 <sup>s</sup> .2	31 <sup>s</sup> .12	22 <sup>s</sup> .5	59 <sup>s</sup> .63	56 <sup>s</sup> .7						
	0 <sup>s</sup> .13	0 <sup>s</sup> .5	0 <sup>s</sup> .12	0 <sup>s</sup> .5	0 <sup>s</sup> .05	2 <sup>s</sup> .2						
20	20 <sup>s</sup> .79	13 <sup>s</sup> .7	31 <sup>s</sup> .24	22 <sup>s</sup> .0	{59 <sup>s</sup> .60}	{54 <sup>s</sup> .1}						
30	20 <sup>s</sup> .95	13 <sup>s</sup> .1	31 <sup>s</sup> .38	21 <sup>s</sup> .4	59 <sup>s</sup> .78	52 <sup>s</sup> .0						
Aug. 9	21 <sup>s</sup> .14	12 <sup>s</sup> .6	31 <sup>s</sup> .55	20 <sup>s</sup> .7	59 <sup>s</sup> .91	49 <sup>s</sup> .8						
19	21 <sup>s</sup> .36	12 <sup>s</sup> .0	31 <sup>s</sup> .76	20 <sup>s</sup> .1	60 <sup>s</sup> .07	47 <sup>s</sup> .9						
	0 <sup>s</sup> .25	0 <sup>s</sup> .7	0 <sup>s</sup> .23	0 <sup>s</sup> .8	0 <sup>s</sup> .19	1 <sup>s</sup> .7						
29	21 <sup>s</sup> .61	11 <sup>s</sup> .3	31 <sup>s</sup> .99	19 <sup>s</sup> .3	60 <sup>s</sup> .26	46 <sup>s</sup> .2						
Sept. 8	21 <sup>s</sup> .88	10 <sup>s</sup> .7	32 <sup>s</sup> .24	18 <sup>s</sup> .5	60 <sup>s</sup> .48	44 <sup>s</sup> .8						
18	22 <sup>s</sup> .17	10 <sup>s</sup> .0	32 <sup>s</sup> .52	17 <sup>s</sup> .7	60 <sup>s</sup> .72	43 <sup>s</sup> .8						
28	22 <sup>s</sup> .48	9 <sup>s</sup> .2	32 <sup>s</sup> .82	16 <sup>s</sup> .7	60 <sup>s</sup> .98	43 <sup>s</sup> .2						
	0 <sup>s</sup> .33	0 <sup>s</sup> .8	0 <sup>s</sup> .32	0 <sup>s</sup> .9	0 <sup>s</sup> .29	0 <sup>s</sup> .0						
Oct. 8	22 <sup>s</sup> .81	8 <sup>s</sup> .4	33 <sup>s</sup> .14	15 <sup>s</sup> .8	61 <sup>s</sup> .27	43 <sup>s</sup> .2						
18	23 <sup>s</sup> .14	7 <sup>s</sup> .6	33 <sup>s</sup> .48	14 <sup>s</sup> .9	61 <sup>s</sup> .57	43 <sup>s</sup> .6						
28	23 <sup>s</sup> .48	6 <sup>s</sup> .8	33 <sup>s</sup> .82	13 <sup>s</sup> .9	61 <sup>s</sup> .88	44 <sup>s</sup> .5						
Nov. 7	23 <sup>s</sup> .83	6 <sup>s</sup> .1	34 <sup>s</sup> .17	13 <sup>s</sup> .0	62 <sup>s</sup> .20	45 <sup>s</sup> .9						
	0 <sup>s</sup> .34	0 <sup>s</sup> .7	0 <sup>s</sup> .35	0 <sup>s</sup> .8	0 <sup>s</sup> .31	1 <sup>s</sup> .8						
17	24 <sup>s</sup> .17	5 <sup>s</sup> .4	34 <sup>s</sup> .52	12 <sup>s</sup> .2	62 <sup>s</sup> .51	47 <sup>s</sup> .7						
27	24 <sup>s</sup> .49	4 <sup>s</sup> .9	34 <sup>s</sup> .85	11 <sup>s</sup> .5	62 <sup>s</sup> .81	49 <sup>s</sup> .8						
Dec. 7	24 <sup>s</sup> .80	4 <sup>s</sup> .5	35 <sup>s</sup> .16	11 <sup>s</sup> .0	63 <sup>s</sup> .08	52 <sup>s</sup> .2						
17	25 <sup>s</sup> .07	4 <sup>s</sup> .3	35 <sup>s</sup> .45	10 <sup>s</sup> .6	63 <sup>s</sup> .33	54 <sup>s</sup> .9						
	0 <sup>s</sup> .23	0 <sup>s</sup> .0	0 <sup>s</sup> .25	0 <sup>s</sup> .1	0 <sup>s</sup> .21	2 <sup>s</sup> .8						
27	25 <sup>s</sup> .30	4 <sup>s</sup> .3	35 <sup>s</sup> .70	10 <sup>s</sup> .5	63 <sup>s</sup> .54	57 <sup>s</sup> .7						
37	25 <sup>s</sup> .48	4 <sup>s</sup> .5	35 <sup>s</sup> .91	10 <sup>s</sup> .6	63 <sup>s</sup> .70	60 <sup>s</sup> .5						



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\eta$ Cancri.		$\varepsilon$ Hydræ.		$\iota$ Ursæ Majoris.	
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.
	<sup>h</sup> 8 <sup>m</sup> 25	<sup>°</sup> 20 <sup>'</sup> 52	<sup>h</sup> 8 <sup>m</sup> 39	<sup>°</sup> 6 <sup>'</sup> 53	<sup>h</sup> 8 <sup>m</sup> 50	<sup>°</sup> 48 <sup>'</sup> 32
Jan. 1	11 <sup>s</sup> .48 <sup>s</sup>	45 <sup>n</sup> .2 <sup>n</sup>	53 <sup>s</sup> .68 <sup>s</sup>	35 <sup>n</sup> .8 <sup>n</sup>	17 <sup>s</sup> .91 <sup>s</sup>	50 <sup>n</sup> .7 <sup>n</sup>
11	11 <sup>s</sup> .67 <sup>s</sup>	44 <sup>n</sup> .8 <sup>n</sup>	53 <sup>s</sup> .87 <sup>s</sup>	34 <sup>n</sup> .5 <sup>n</sup>	18 <sup>s</sup> .20 <sup>s</sup>	51 <sup>n</sup> .7 <sup>n</sup>
21	11 <sup>s</sup> .81 <sup>s</sup>	44 <sup>n</sup> .6 <sup>n</sup>	54 <sup>s</sup> .01 <sup>s</sup>	33 <sup>n</sup> .4 <sup>n</sup>	18 <sup>s</sup> .42 <sup>s</sup>	53 <sup>n</sup> .1 <sup>n</sup>
31	11 <sup>s</sup> .90 <sup>s</sup>	44 <sup>n</sup> .6 <sup>n</sup>	54 <sup>s</sup> .11 <sup>s</sup>	32 <sup>n</sup> .5 <sup>n</sup>	18 <sup>s</sup> .57 <sup>s</sup>	54 <sup>n</sup> .7 <sup>n</sup>
	<sup>°</sup> 04	<sup>°</sup> 02	<sup>°</sup> 04	<sup>°</sup> 07	<sup>°</sup> 07	<sup>°</sup> 18
Feb. 10	11 <sup>s</sup> .94 <sup>s</sup>	44 <sup>n</sup> .8 <sup>n</sup>	54 <sup>s</sup> .15 <sup>s</sup>	31 <sup>n</sup> .8 <sup>n</sup>	18 <sup>s</sup> .64 <sup>s</sup>	56 <sup>n</sup> .5 <sup>n</sup>
20	11 <sup>s</sup> .92 <sup>s</sup>	45 <sup>n</sup> .2 <sup>n</sup>	54 <sup>s</sup> .15 <sup>s</sup>	31 <sup>n</sup> .3 <sup>n</sup>	18 <sup>s</sup> .65 <sup>s</sup>	58 <sup>n</sup> .3 <sup>n</sup>
Mar. 2	11 <sup>s</sup> .86 <sup>s</sup>	45 <sup>n</sup> .7 <sup>n</sup>	54 <sup>s</sup> .10 <sup>s</sup>	31 <sup>n</sup> .1 <sup>n</sup>	18 <sup>s</sup> .58 <sup>s</sup>	60 <sup>n</sup> .2 <sup>n</sup>
12	11 <sup>s</sup> .76 <sup>s</sup>	46 <sup>n</sup> .2 <sup>n</sup>	54 <sup>s</sup> .01 <sup>s</sup>	31 <sup>n</sup> .0 <sup>n</sup>	18 <sup>s</sup> .45 <sup>s</sup>	62 <sup>n</sup> .0 <sup>n</sup>
	<sup>°</sup> 13	<sup>°</sup> 06	<sup>°</sup> 12	<sup>°</sup> 00	<sup>°</sup> 17	<sup>°</sup> 17
Apr. 22	11 <sup>s</sup> .63 <sup>s</sup>	46 <sup>n</sup> .8 <sup>n</sup>	53 <sup>s</sup> .89 <sup>s</sup>	31 <sup>n</sup> .0 <sup>n</sup>	18 <sup>s</sup> .28 <sup>s</sup>	63 <sup>n</sup> .7 <sup>n</sup>
1	11 <sup>s</sup> .47 <sup>s</sup>	47 <sup>n</sup> .4 <sup>n</sup>	53 <sup>s</sup> .75 <sup>s</sup>	31 <sup>n</sup> .2 <sup>n</sup>	18 <sup>s</sup> .07 <sup>s</sup>	65 <sup>n</sup> .1 <sup>n</sup>
11	11 <sup>s</sup> .30 <sup>s</sup>	48 <sup>n</sup> .0 <sup>n</sup>	53 <sup>s</sup> .60 <sup>s</sup>	31 <sup>n</sup> .5 <sup>n</sup>	17 <sup>s</sup> .84 <sup>s</sup>	66 <sup>n</sup> .3 <sup>n</sup>
21	11 <sup>s</sup> .13 <sup>s</sup>	48 <sup>n</sup> .5 <sup>n</sup>	53 <sup>s</sup> .44 <sup>s</sup>	31 <sup>n</sup> .9 <sup>n</sup>	17 <sup>s</sup> .59 <sup>s</sup>	67 <sup>n</sup> .2 <sup>n</sup>
	<sup>°</sup> 16	<sup>°</sup> 05	<sup>°</sup> 15	<sup>°</sup> 05	<sup>°</sup> 24	<sup>°</sup> 05
May 1	10 <sup>s</sup> .97 <sup>s</sup>	49 <sup>n</sup> .0 <sup>n</sup>	53 <sup>s</sup> .29 <sup>s</sup>	32 <sup>n</sup> .4 <sup>n</sup>	17 <sup>s</sup> .35 <sup>s</sup>	67 <sup>n</sup> .7 <sup>n</sup>
11	10 <sup>s</sup> .83 <sup>s</sup>	49 <sup>n</sup> .3 <sup>n</sup>	53 <sup>s</sup> .15 <sup>s</sup>	33 <sup>n</sup> .0 <sup>n</sup>	17 <sup>s</sup> .13 <sup>s</sup>	67 <sup>n</sup> .9 <sup>n</sup>
21	10 <sup>s</sup> .71 <sup>s</sup>	49 <sup>n</sup> .6 <sup>n</sup>	53 <sup>s</sup> .04 <sup>s</sup>	33 <sup>n</sup> .5 <sup>n</sup>	16 <sup>s</sup> .92 <sup>s</sup>	67 <sup>n</sup> .7 <sup>n</sup>
31	10 <sup>s</sup> .62 <sup>s</sup>	49 <sup>n</sup> .8 <sup>n</sup>	52 <sup>s</sup> .94 <sup>s</sup>	34 <sup>n</sup> .1 <sup>n</sup>	16 <sup>s</sup> .75 <sup>s</sup>	67 <sup>n</sup> .2 <sup>n</sup>
	<sup>°</sup> 06	<sup>°</sup> 02	<sup>°</sup> 07	<sup>°</sup> 07	<sup>°</sup> 13	<sup>°</sup> 08
June 10	10 <sup>s</sup> .56 <sup>s</sup>	50 <sup>n</sup> .0 <sup>n</sup>	52 <sup>s</sup> .87 <sup>s</sup>	34 <sup>n</sup> .8 <sup>n</sup>	16 <sup>s</sup> .62 <sup>s</sup>	66 <sup>n</sup> .4 <sup>n</sup>
20	10 <sup>s</sup> .53 <sup>s</sup>	50 <sup>n</sup> .0 <sup>n</sup>	52 <sup>s</sup> .83 <sup>s</sup>	35 <sup>n</sup> .5 <sup>n</sup>	16 <sup>s</sup> .53 <sup>s</sup>	65 <sup>n</sup> .3 <sup>n</sup>
30	10 <sup>s</sup> .53 <sup>s</sup>	50 <sup>n</sup> .0 <sup>n</sup>	52 <sup>s</sup> .82 <sup>s</sup>	36 <sup>n</sup> .1 <sup>n</sup>	16 <sup>s</sup> .48 <sup>s</sup>	63 <sup>n</sup> .9 <sup>n</sup>
July 10	10 <sup>s</sup> .57 <sup>s</sup>	49 <sup>n</sup> .9 <sup>n</sup>	52 <sup>s</sup> .84 <sup>s</sup>	36 <sup>n</sup> .8 <sup>n</sup>	16 <sup>s</sup> .48 <sup>s</sup>	62 <sup>n</sup> .4 <sup>n</sup>
	<sup>°</sup> 07	<sup>°</sup> 01	<sup>°</sup> 04	<sup>°</sup> 06	<sup>°</sup> 05	<sup>°</sup> 17
20	10 <sup>s</sup> .64 <sup>s</sup>	49 <sup>n</sup> .8 <sup>n</sup>	52 <sup>s</sup> .88 <sup>s</sup>	37 <sup>n</sup> .4 <sup>n</sup>	16 <sup>s</sup> .53 <sup>s</sup>	60 <sup>n</sup> .7 <sup>n</sup>
30	10 <sup>s</sup> .75 <sup>s</sup>	49 <sup>n</sup> .5 <sup>n</sup>	52 <sup>s</sup> .88 <sup>s</sup>	37 <sup>n</sup> .9 <sup>n</sup>	16 <sup>s</sup> .62 <sup>s</sup>	58 <sup>n</sup> .8 <sup>n</sup>
Aug. 9	10 <sup>s</sup> .88 <sup>s</sup>	49 <sup>n</sup> .2 <sup>n</sup>	53 <sup>s</sup> .08 <sup>s</sup>	38 <sup>n</sup> .4 <sup>n</sup>	16 <sup>s</sup> .77 <sup>s</sup>	56 <sup>n</sup> .7 <sup>n</sup>
19	11 <sup>s</sup> .04 <sup>s</sup>	48 <sup>n</sup> .8 <sup>n</sup>	53 <sup>s</sup> .21 <sup>s</sup>	38 <sup>n</sup> .7 <sup>n</sup>	16 <sup>s</sup> .96 <sup>s</sup>	54 <sup>n</sup> .6 <sup>n</sup>
	<sup>°</sup> 19	<sup>°</sup> 05	<sup>°</sup> 16	<sup>°</sup> 02	<sup>°</sup> 22	<sup>°</sup> 20
29	11 <sup>s</sup> .23 <sup>s</sup>	48 <sup>n</sup> .3 <sup>n</sup>	53 <sup>s</sup> .37 <sup>s</sup>	38 <sup>n</sup> .9 <sup>n</sup>	17 <sup>s</sup> .18 <sup>s</sup>	52 <sup>n</sup> .6 <sup>n</sup>
Sept. 8	11 <sup>s</sup> .45 <sup>s</sup>	47 <sup>n</sup> .6 <sup>n</sup>	53 <sup>s</sup> .56 <sup>s</sup>	38 <sup>n</sup> .9 <sup>n</sup>	17 <sup>s</sup> .45 <sup>s</sup>	50 <sup>n</sup> .5 <sup>n</sup>
18	11 <sup>s</sup> .70 <sup>s</sup>	46 <sup>n</sup> .8 <sup>n</sup>	53 <sup>s</sup> .78 <sup>s</sup>	38 <sup>n</sup> .7 <sup>n</sup>	17 <sup>s</sup> .75 <sup>s</sup>	48 <sup>n</sup> .5 <sup>n</sup>
28	11 <sup>s</sup> .96 <sup>s</sup>	45 <sup>n</sup> .9 <sup>n</sup>	54 <sup>s</sup> .02 <sup>s</sup>	38 <sup>n</sup> .2 <sup>n</sup>	18 <sup>s</sup> .09 <sup>s</sup>	46 <sup>n</sup> .5 <sup>n</sup>
	<sup>°</sup> 29	<sup>°</sup> 10	<sup>°</sup> 26	<sup>°</sup> 07	<sup>°</sup> 38	<sup>°</sup> 18
Oct. 8	12 <sup>s</sup> .25 <sup>s</sup>	44 <sup>n</sup> .9 <sup>n</sup>	54 <sup>s</sup> .28 <sup>s</sup>	37 <sup>n</sup> .5 <sup>n</sup>	18 <sup>s</sup> .47 <sup>s</sup>	44 <sup>n</sup> .7 <sup>n</sup>
18	12 <sup>s</sup> .56 <sup>s</sup>	43 <sup>n</sup> .8 <sup>n</sup>	54 <sup>s</sup> .56 <sup>s</sup>	36 <sup>n</sup> .6 <sup>n</sup>	18 <sup>s</sup> .87 <sup>s</sup>	43 <sup>n</sup> .0 <sup>n</sup>
28	12 <sup>s</sup> .88 <sup>s</sup>	42 <sup>n</sup> .6 <sup>n</sup>	54 <sup>s</sup> .86 <sup>s</sup>	35 <sup>n</sup> .4 <sup>n</sup>	19 <sup>s</sup> .30 <sup>s</sup>	41 <sup>n</sup> .5 <sup>n</sup>
Nov. 7	13 <sup>s</sup> .21 <sup>s</sup>	41 <sup>n</sup> .4 <sup>n</sup>	55 <sup>s</sup> .17 <sup>s</sup>	34 <sup>n</sup> .1 <sup>n</sup>	19 <sup>s</sup> .74 <sup>s</sup>	40 <sup>n</sup> .3 <sup>n</sup>
	<sup>°</sup> 34	<sup>°</sup> 12	<sup>°</sup> 32	<sup>°</sup> 15	<sup>°</sup> 46	<sup>°</sup> 09
17	13 <sup>s</sup> .55 <sup>s</sup>	40 <sup>n</sup> .2 <sup>n</sup>	55 <sup>s</sup> .49 <sup>s</sup>	32 <sup>n</sup> .6 <sup>n</sup>	20 <sup>s</sup> .20 <sup>s</sup>	39 <sup>n</sup> .4 <sup>n</sup>
27	13 <sup>s</sup> .88 <sup>s</sup>	39 <sup>n</sup> .1 <sup>n</sup>	55 <sup>s</sup> .81 <sup>s</sup>	31 <sup>n</sup> .0 <sup>n</sup>	20 <sup>s</sup> .65 <sup>s</sup>	38 <sup>n</sup> .8 <sup>n</sup>
Dec. 7	14 <sup>s</sup> .19 <sup>s</sup>	38 <sup>n</sup> .0 <sup>n</sup>	56 <sup>s</sup> .11 <sup>s</sup>	29 <sup>n</sup> .4 <sup>n</sup>	21 <sup>s</sup> .09 <sup>s</sup>	38 <sup>n</sup> .5 <sup>n</sup>
17	14 <sup>s</sup> .49 <sup>s</sup>	37 <sup>n</sup> .1 <sup>n</sup>	56 <sup>s</sup> .39 <sup>s</sup>	27 <sup>n</sup> .8 <sup>n</sup>	21 <sup>s</sup> .50 <sup>s</sup>	38 <sup>n</sup> .6 <sup>n</sup>
	<sup>°</sup> 26	<sup>°</sup> 07	<sup>°</sup> 25	<sup>°</sup> 15	<sup>°</sup> 37	<sup>°</sup> 05
27	14 <sup>s</sup> .75 <sup>s</sup>	36 <sup>n</sup> .4 <sup>n</sup>	56 <sup>s</sup> .64 <sup>s</sup>	26 <sup>n</sup> .3 <sup>n</sup>	21 <sup>s</sup> .87 <sup>s</sup>	39 <sup>n</sup> .1 <sup>n</sup>
37	14 <sup>s</sup> .97 <sup>s</sup>	35 <sup>n</sup> .9 <sup>n</sup>	56 <sup>s</sup> .86 <sup>s</sup>	24 <sup>n</sup> .9 <sup>n</sup>	22 <sup>s</sup> .20 <sup>s</sup>	40 <sup>n</sup> .0 <sup>n</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	83 Cancri.			ε Argus.			α Hydræ.					
	R.A.	Dec. North.		R.A.	Dec. South.		R.A.	Dec. South.				
	<sup>h</sup> 9	<sup>m</sup> 11	<sup>°</sup> 18	<sup>'</sup> 14	<sup>h</sup> 9	<sup>m</sup> 13	<sup>°</sup> 58	<sup>'</sup> 43	<sup>h</sup> 9	<sup>m</sup> 21	<sup>°</sup> 8	<sup>'</sup> 5
Jan. 1	43 <sup>s</sup> 32	0 <sup>s</sup> 24	72 <sup>s</sup> 6	0 <sup>s</sup> 7	38 <sup>s</sup> 56	0 <sup>s</sup> 26	36 <sup>s</sup> 2	3 <sup>s</sup> 6	12 <sup>s</sup> 13	0 <sup>s</sup> 22	46 <sup>s</sup> 1	2 <sup>s</sup> 1
11	43 <sup>s</sup> 56	0 <sup>s</sup> 18	71 <sup>s</sup> 9	0 <sup>s</sup> 6	38 <sup>s</sup> 82	0 <sup>s</sup> 17	39 <sup>s</sup> 8	3 <sup>s</sup> 7	12 <sup>s</sup> 35	0 <sup>s</sup> 17	48 <sup>s</sup> 2	2 <sup>s</sup> 1
21	43 <sup>s</sup> 74	0 <sup>s</sup> 14	71 <sup>s</sup> 3	0 <sup>s</sup> 3	38 <sup>s</sup> 99	0 <sup>s</sup> 10	43 <sup>s</sup> 5	3 <sup>s</sup> 7	12 <sup>s</sup> 52	0 <sup>s</sup> 13	50 <sup>s</sup> 3	1 <sup>s</sup> 9
31	43 <sup>s</sup> 88	0 <sup>s</sup> 08	71 <sup>s</sup> 0	0 <sup>s</sup> 0	39 <sup>s</sup> 09	0 <sup>s</sup> 01	47 <sup>s</sup> 2	3 <sup>s</sup> 7	12 <sup>s</sup> 65	0 <sup>s</sup> 07	52 <sup>s</sup> 2	1 <sup>s</sup> 6
Feb. 10	43 <sup>s</sup> 96	0 <sup>s</sup> 03	71 <sup>s</sup> 0	0 <sup>s</sup> 2	39 <sup>s</sup> 10	0 <sup>s</sup> 07	50 <sup>s</sup> 9	3 <sup>s</sup> 5	12 <sup>s</sup> 72	0 <sup>s</sup> 03	53 <sup>s</sup> 8	1 <sup>s</sup> 4
20	43 <sup>s</sup> 99	0 <sup>s</sup> 02	71 <sup>s</sup> 2	0 <sup>s</sup> 3	39 <sup>s</sup> 03	0 <sup>s</sup> 15	54 <sup>s</sup> 4	3 <sup>s</sup> 2	12 <sup>s</sup> 75	0 <sup>s</sup> 02	55 <sup>s</sup> 2	1 <sup>s</sup> 2
Mar. 2	43 <sup>s</sup> 97	0 <sup>s</sup> 06	71 <sup>s</sup> 5	0 <sup>s</sup> 5	38 <sup>s</sup> 88	0 <sup>s</sup> 21	57 <sup>s</sup> 6	3 <sup>s</sup> 0	12 <sup>s</sup> 73	0 <sup>s</sup> 06	56 <sup>s</sup> 4	0 <sup>s</sup> 9
12	43 <sup>s</sup> 91	0 <sup>s</sup> 10	72 <sup>s</sup> 0	0 <sup>s</sup> 6	38 <sup>s</sup> 67	0 <sup>s</sup> 26	60 <sup>s</sup> 6	2 <sup>s</sup> 6	12 <sup>s</sup> 67	0 <sup>s</sup> 09	57 <sup>s</sup> 3	0 <sup>s</sup> 7
22	43 <sup>s</sup> 81	0 <sup>s</sup> 12	72 <sup>s</sup> 6	0 <sup>s</sup> 7	38 <sup>s</sup> 41	0 <sup>s</sup> 31	63 <sup>s</sup> 2	2 <sup>s</sup> 1	12 <sup>s</sup> 58	0 <sup>s</sup> 12	58 <sup>s</sup> 0	0 <sup>s</sup> 5
Apr. 1	43 <sup>s</sup> 69	0 <sup>s</sup> 14	73 <sup>s</sup> 3	0 <sup>s</sup> 6	38 <sup>s</sup> 10	0 <sup>s</sup> 34	65 <sup>s</sup> 3	1 <sup>s</sup> 7	12 <sup>s</sup> 46	0 <sup>s</sup> 14	58 <sup>s</sup> 5	0 <sup>s</sup> 2
11	43 <sup>s</sup> 55	0 <sup>s</sup> 16	73 <sup>s</sup> 9	0 <sup>s</sup> 6	37 <sup>s</sup> 76	0 <sup>s</sup> 37	67 <sup>s</sup> 0	1 <sup>s</sup> 2	12 <sup>s</sup> 32	0 <sup>s</sup> 14	58 <sup>s</sup> 7	0 <sup>s</sup> 1
21	43 <sup>s</sup> 39	0 <sup>s</sup> 15	74 <sup>s</sup> 5	0 <sup>s</sup> 7	37 <sup>s</sup> 39	0 <sup>s</sup> 37	68 <sup>s</sup> 2	0 <sup>s</sup> 7	12 <sup>s</sup> 18	0 <sup>s</sup> 15	58 <sup>s</sup> 6	0 <sup>s</sup> 3
May 1	43 <sup>s</sup> 24	0 <sup>s</sup> 15	75 <sup>s</sup> 2	0 <sup>s</sup> 5	37 <sup>s</sup> 02	0 <sup>s</sup> 37	68 <sup>s</sup> 9	0 <sup>s</sup> 2	12 <sup>s</sup> 03	0 <sup>s</sup> 14	58 <sup>s</sup> 3	0 <sup>s</sup> 4
11	43 <sup>s</sup> 09	0 <sup>s</sup> 12	75 <sup>s</sup> 7	0 <sup>s</sup> 5	36 <sup>s</sup> 65	0 <sup>s</sup> 36	69 <sup>s</sup> 1	0 <sup>s</sup> 3	11 <sup>s</sup> 89	0 <sup>s</sup> 13	57 <sup>s</sup> 9	0 <sup>s</sup> 6
21	42 <sup>s</sup> 97	0 <sup>s</sup> 11	76 <sup>s</sup> 2	0 <sup>s</sup> 4	36 <sup>s</sup> 29	0 <sup>s</sup> 34	68 <sup>s</sup> 8	0 <sup>s</sup> 8	11 <sup>s</sup> 76	0 <sup>s</sup> 11	57 <sup>s</sup> 3	0 <sup>s</sup> 8
31	42 <sup>s</sup> 86	0 <sup>s</sup> 09	76 <sup>s</sup> 6	0 <sup>s</sup> 3	35 <sup>s</sup> 95	0 <sup>s</sup> 31	68 <sup>s</sup> 0	1 <sup>s</sup> 3	11 <sup>s</sup> 65	0 <sup>s</sup> 10	56 <sup>s</sup> 5	0 <sup>s</sup> 9
June 10	42 <sup>s</sup> 77	0 <sup>s</sup> 06	76 <sup>s</sup> 9	0 <sup>s</sup> 2	35 <sup>s</sup> 64	0 <sup>s</sup> 27	66 <sup>s</sup> 7	1 <sup>s</sup> 8	11 <sup>s</sup> 55	0 <sup>s</sup> 07	55 <sup>s</sup> 6	1 <sup>s</sup> 1
20	42 <sup>s</sup> 71	0 <sup>s</sup> 03	77 <sup>s</sup> 1	0 <sup>s</sup> 1	35 <sup>s</sup> 37	0 <sup>s</sup> 23	64 <sup>s</sup> 9	2 <sup>s</sup> 1	11 <sup>s</sup> 48	0 <sup>s</sup> 05	54 <sup>s</sup> 5	1 <sup>s</sup> 2
30	42 <sup>s</sup> 68	0 <sup>s</sup> 01	77 <sup>s</sup> 2	0 <sup>s</sup> 1	35 <sup>s</sup> 14	0 <sup>s</sup> 19	62 <sup>s</sup> 8	2 <sup>s</sup> 5	11 <sup>s</sup> 43	0 <sup>s</sup> 03	53 <sup>s</sup> 3	1 <sup>s</sup> 2
July 10	42 <sup>s</sup> 67	0 <sup>s</sup> 03	77 <sup>s</sup> 3	0 <sup>s</sup> 1	34 <sup>s</sup> 95	0 <sup>s</sup> 13	60 <sup>s</sup> 3	2 <sup>s</sup> 8	11 <sup>s</sup> 40	0 <sup>s</sup> 00	52 <sup>s</sup> 1	1 <sup>s</sup> 3
20	42 <sup>s</sup> 70	0 <sup>s</sup> 05	77 <sup>s</sup> 2	0 <sup>s</sup> 2	34 <sup>s</sup> 82	0 <sup>s</sup> 07	57 <sup>s</sup> 5	3 <sup>s</sup> 0	11 <sup>s</sup> 40	0 <sup>s</sup> 03	50 <sup>s</sup> 8	1 <sup>s</sup> 3
30	42 <sup>s</sup> 75	0 <sup>s</sup> 09	77 <sup>s</sup> 0	0 <sup>s</sup> 3	34 <sup>s</sup> 75	0 <sup>s</sup> 00	54 <sup>s</sup> 5	3 <sup>s</sup> 3	11 <sup>s</sup> 43	0 <sup>s</sup> 06	49 <sup>s</sup> 5	1 <sup>s</sup> 2
Aug. 9	42 <sup>s</sup> 84	0 <sup>s</sup> 11	76 <sup>s</sup> 7	0 <sup>s</sup> 4	34 <sup>s</sup> 75	0 <sup>s</sup> 06	51 <sup>s</sup> 2	3 <sup>s</sup> 1	11 <sup>s</sup> 49	0 <sup>s</sup> 09	48 <sup>s</sup> 3	1 <sup>s</sup> 2
19	42 <sup>s</sup> 95	0 <sup>s</sup> 15	76 <sup>s</sup> 3	0 <sup>s</sup> 6	34 <sup>s</sup> 81	0 <sup>s</sup> 13	48 <sup>s</sup> 1	2 <sup>s</sup> 9	11 <sup>s</sup> 58	0 <sup>s</sup> 12	47 <sup>s</sup> 1	0 <sup>s</sup> 9
29	43 <sup>s</sup> 10	0 <sup>s</sup> 17	75 <sup>s</sup> 7	0 <sup>s</sup> 7	34 <sup>s</sup> 94	0 <sup>s</sup> 20	45 <sup>s</sup> 2	2 <sup>s</sup> 7	11 <sup>s</sup> 70	0 <sup>s</sup> 14	46 <sup>s</sup> 2	0 <sup>s</sup> 7
Sept. 8	43 <sup>s</sup> 27	0 <sup>s</sup> 20	75 <sup>s</sup> 0	0 <sup>s</sup> 9	35 <sup>s</sup> 14	0 <sup>s</sup> 27	42 <sup>s</sup> 5	2 <sup>s</sup> 4	11 <sup>s</sup> 84	0 <sup>s</sup> 18	45 <sup>s</sup> 5	0 <sup>s</sup> 4
18	43 <sup>s</sup> 47	0 <sup>s</sup> 23	74 <sup>s</sup> 1	1 <sup>s</sup> 1	35 <sup>s</sup> 41	0 <sup>s</sup> 32	40 <sup>s</sup> 1	2 <sup>s</sup> 0	12 <sup>s</sup> 02	0 <sup>s</sup> 20	45 <sup>s</sup> 1	0 <sup>s</sup> 1
28	43 <sup>s</sup> 70	0 <sup>s</sup> 25	73 <sup>s</sup> 0	1 <sup>s</sup> 2	35 <sup>s</sup> 73	0 <sup>s</sup> 38	38 <sup>s</sup> 1	1 <sup>s</sup> 4	12 <sup>s</sup> 22	0 <sup>s</sup> 24	45 <sup>s</sup> 0	0 <sup>s</sup> 2
Oct. 8	43 <sup>s</sup> 95	0 <sup>s</sup> 28	71 <sup>s</sup> 8	1 <sup>s</sup> 3	36 <sup>s</sup> 11	0 <sup>s</sup> 43	36 <sup>s</sup> 7	0 <sup>s</sup> 9	12 <sup>s</sup> 46	0 <sup>s</sup> 26	45 <sup>s</sup> 2	0 <sup>s</sup> 6
18	44 <sup>s</sup> 23	0 <sup>s</sup> 31	70 <sup>s</sup> 5	1 <sup>s</sup> 4	36 <sup>s</sup> 54	0 <sup>s</sup> 46	35 <sup>s</sup> 8	0 <sup>s</sup> 3	12 <sup>s</sup> 72	0 <sup>s</sup> 28	45 <sup>s</sup> 8	0 <sup>s</sup> 9
28	44 <sup>s</sup> 54	0 <sup>s</sup> 32	69 <sup>s</sup> 1	1 <sup>s</sup> 6	37 <sup>s</sup> 00	0 <sup>s</sup> 49	35 <sup>s</sup> 5	0 <sup>s</sup> 4	13 <sup>s</sup> 00	0 <sup>s</sup> 30	46 <sup>s</sup> 7	1 <sup>s</sup> 3
Nov. 7	44 <sup>s</sup> 86	0 <sup>s</sup> 33	67 <sup>s</sup> 5	1 <sup>s</sup> 5	37 <sup>s</sup> 49	0 <sup>s</sup> 49	35 <sup>s</sup> 9	1 <sup>s</sup> 1	13 <sup>s</sup> 30	0 <sup>s</sup> 32	48 <sup>s</sup> 0	1 <sup>s</sup> 6
17	45 <sup>s</sup> 19	0 <sup>s</sup> 34	66 <sup>s</sup> 0	1 <sup>s</sup> 5	37 <sup>s</sup> 98	0 <sup>s</sup> 48	37 <sup>s</sup> 0	1 <sup>s</sup> 7	13 <sup>s</sup> 62	0 <sup>s</sup> 32	49 <sup>s</sup> 6	1 <sup>s</sup> 8
27	45 <sup>s</sup> 53	0 <sup>s</sup> 33	64 <sup>s</sup> 5	1 <sup>s</sup> 5	38 <sup>s</sup> 46	0 <sup>s</sup> 46	38 <sup>s</sup> 7	2 <sup>s</sup> 2	13 <sup>s</sup> 94	0 <sup>s</sup> 31	51 <sup>s</sup> 4	2 <sup>s</sup> 0
Dec. 7	45 <sup>s</sup> 86	0 <sup>s</sup> 32	63 <sup>s</sup> 0	1 <sup>s</sup> 3	38 <sup>s</sup> 92	0 <sup>s</sup> 42	40 <sup>s</sup> 9	2 <sup>s</sup> 7	14 <sup>s</sup> 25	0 <sup>s</sup> 30	53 <sup>s</sup> 4	2 <sup>s</sup> 2
17	46 <sup>s</sup> 18	0 <sup>s</sup> 29	61 <sup>s</sup> 7	1 <sup>s</sup> 1	39 <sup>s</sup> 34	0 <sup>s</sup> 36	43 <sup>s</sup> 6	3 <sup>s</sup> 2	14 <sup>s</sup> 55	0 <sup>s</sup> 27	55 <sup>s</sup> 6	2 <sup>s</sup> 3
27	46 <sup>s</sup> 47	0 <sup>s</sup> 25	60 <sup>s</sup> 6	0 <sup>s</sup> 9	39 <sup>s</sup> 70	0 <sup>s</sup> 29	46 <sup>s</sup> 8	3 <sup>s</sup> 5	14 <sup>s</sup> 82	0 <sup>s</sup> 24	57 <sup>s</sup> 9	2 <sup>s</sup> 2
37	46 <sup>s</sup> 72		59 <sup>s</sup> 7		39 <sup>s</sup> 99		50 <sup>s</sup> 3		15 <sup>s</sup> 06		60 <sup>s</sup> 1	



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.		θ Ursæ Majoris.		ε Leonis.		π Leonis.			
		R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.		
		<sup>h</sup> 9	<sup>m</sup> 24	<sup>°</sup> 52	<sup>'</sup> 15	<sup>h</sup> 9	<sup>m</sup> 53	<sup>°</sup> 8	<sup>'</sup> 39
Jan.	1	8 <sup>s</sup> .98	0 <sup>s</sup> .35	54 <sup>s</sup> .8	1 <sup>s</sup> .0	28 <sup>s</sup> .04	0 <sup>s</sup> .27	71 <sup>s</sup> .6	0 <sup>s</sup> .6
	11	9 <sup>s</sup> .33	0 <sup>s</sup> .28	55 <sup>s</sup> .8	1 <sup>s</sup> .3	28 <sup>s</sup> .31	0 <sup>s</sup> .22	71 <sup>s</sup> .0	0 <sup>s</sup> .3
	21	9 <sup>s</sup> .61	0 <sup>s</sup> .21	57 <sup>s</sup> .1	1 <sup>s</sup> .6	28 <sup>s</sup> .53	0 <sup>s</sup> .17	70 <sup>s</sup> .7	0 <sup>s</sup> .0
	31	9 <sup>s</sup> .82	0 <sup>s</sup> .13	58 <sup>s</sup> .7	1 <sup>s</sup> .9	28 <sup>s</sup> .70	0 <sup>s</sup> .11	70 <sup>s</sup> .7	0 <sup>s</sup> .3
Feb.	10	9 <sup>s</sup> .95	0 <sup>s</sup> .05	60 <sup>s</sup> .6	2 <sup>s</sup> .1	28 <sup>s</sup> .81	0 <sup>s</sup> .07	71 <sup>s</sup> .0	0 <sup>s</sup> .5
	20	10 <sup>s</sup> .00	0 <sup>s</sup> .02	62 <sup>s</sup> .7	2 <sup>s</sup> .1	28 <sup>s</sup> .88	0 <sup>s</sup> .01	71 <sup>s</sup> .5	0 <sup>s</sup> .7
Mar.	2	9 <sup>s</sup> .98	0 <sup>s</sup> .09	64 <sup>s</sup> .8	2 <sup>s</sup> .1	28 <sup>s</sup> .89	0 <sup>s</sup> .04	72 <sup>s</sup> .2	0 <sup>s</sup> .9
	12	9 <sup>s</sup> .89	0 <sup>s</sup> .16	66 <sup>s</sup> .9	2 <sup>s</sup> .0	28 <sup>s</sup> .85	0 <sup>s</sup> .03	73 <sup>s</sup> .1	0 <sup>s</sup> .9
	22	9 <sup>s</sup> .73	0 <sup>s</sup> .20	68 <sup>s</sup> .9	1 <sup>s</sup> .8	28 <sup>s</sup> .77	0 <sup>s</sup> .11	74 <sup>s</sup> .0	1 <sup>s</sup> .0
Apr.	1	9 <sup>s</sup> .53	0 <sup>s</sup> .23	70 <sup>s</sup> .7	1 <sup>s</sup> .5	28 <sup>s</sup> .66	0 <sup>s</sup> .13	75 <sup>s</sup> .0	0 <sup>s</sup> .9
	11	9 <sup>s</sup> .30	0 <sup>s</sup> .26	72 <sup>s</sup> .2	1 <sup>s</sup> .2	28 <sup>s</sup> .53	0 <sup>s</sup> .15	75 <sup>s</sup> .9	0 <sup>s</sup> .9
	21	9 <sup>s</sup> .04	0 <sup>s</sup> .26	73 <sup>s</sup> .4	0 <sup>s</sup> .8	28 <sup>s</sup> .38	0 <sup>s</sup> .15	76 <sup>s</sup> .8	0 <sup>s</sup> .8
May	1	8 <sup>s</sup> .78	0 <sup>s</sup> .25	74 <sup>s</sup> .2	0 <sup>s</sup> .5	28 <sup>s</sup> .23	0 <sup>s</sup> .15	77 <sup>s</sup> .6	0 <sup>s</sup> .6
	11	8 <sup>s</sup> .53	0 <sup>s</sup> .24	74 <sup>s</sup> .7	0 <sup>s</sup> .0	28 <sup>s</sup> .08	0 <sup>s</sup> .14	78 <sup>s</sup> .2	0 <sup>s</sup> .6
	21	8 <sup>s</sup> .29	0 <sup>s</sup> .21	74 <sup>s</sup> .7	0 <sup>s</sup> .3	27 <sup>s</sup> .94	0 <sup>s</sup> .12	78 <sup>s</sup> .8	0 <sup>s</sup> .4
	31	8 <sup>s</sup> .08	0 <sup>s</sup> .18	74 <sup>s</sup> .4	0 <sup>s</sup> .7	27 <sup>s</sup> .82	0 <sup>s</sup> .11	79 <sup>s</sup> .2	0 <sup>s</sup> .2
June	10	7 <sup>s</sup> .90	0 <sup>s</sup> .15	73 <sup>s</sup> .7	1 <sup>s</sup> .0	27 <sup>s</sup> .71	0 <sup>s</sup> .08	79 <sup>s</sup> .4	0 <sup>s</sup> .0
	20	7 <sup>s</sup> .75	0 <sup>s</sup> .10	72 <sup>s</sup> .7	1 <sup>s</sup> .4	27 <sup>s</sup> .63	0 <sup>s</sup> .05	79 <sup>s</sup> .4	0 <sup>s</sup> .1
	30	7 <sup>s</sup> .65	0 <sup>s</sup> .05	71 <sup>s</sup> .3	1 <sup>s</sup> .6	27 <sup>s</sup> .58	0 <sup>s</sup> .03	79 <sup>s</sup> .3	0 <sup>s</sup> .2
July	10	7 <sup>s</sup> .60	0 <sup>s</sup> .01	69 <sup>s</sup> .7	1 <sup>s</sup> .8	27 <sup>s</sup> .55	0 <sup>s</sup> .00	79 <sup>s</sup> .1	0 <sup>s</sup> .4
	20	7 <sup>s</sup> .59	0 <sup>s</sup> .04	67 <sup>s</sup> .9	2 <sup>s</sup> .1	27 <sup>s</sup> .55	0 <sup>s</sup> .03	78 <sup>s</sup> .7	0 <sup>s</sup> .5
	30	7 <sup>s</sup> .63	0 <sup>s</sup> .09	65 <sup>s</sup> .8	2 <sup>s</sup> .3	27 <sup>s</sup> .58	0 <sup>s</sup> .06	78 <sup>s</sup> .2	0 <sup>s</sup> .7
Aug.	9	7 <sup>s</sup> .72	0 <sup>s</sup> .15	63 <sup>s</sup> .5	2 <sup>s</sup> .5	27 <sup>s</sup> .64	0 <sup>s</sup> .09	77 <sup>s</sup> .5	0 <sup>s</sup> .9
	19	7 <sup>s</sup> .87	0 <sup>s</sup> .18	61 <sup>s</sup> .0	2 <sup>s</sup> .4	27 <sup>s</sup> .73	0 <sup>s</sup> .12	76 <sup>s</sup> .6	1 <sup>s</sup> .1
	29	8 <sup>s</sup> .05	0 <sup>s</sup> .23	58 <sup>s</sup> .6	2 <sup>s</sup> .4	27 <sup>s</sup> .85	0 <sup>s</sup> .15	75 <sup>s</sup> .5	1 <sup>s</sup> .2
Sept.	8	8 <sup>s</sup> .28	0 <sup>s</sup> .28	56 <sup>s</sup> .2	2 <sup>s</sup> .5	28 <sup>s</sup> .00	0 <sup>s</sup> .19	74 <sup>s</sup> .3	1 <sup>s</sup> .3
	18	8 <sup>s</sup> .56	0 <sup>s</sup> .32	53 <sup>s</sup> .7	2 <sup>s</sup> .3	28 <sup>s</sup> .19	0 <sup>s</sup> .21	73 <sup>s</sup> .0	1 <sup>s</sup> .4
	28	8 <sup>s</sup> .88	0 <sup>s</sup> .37	51 <sup>s</sup> .4	2 <sup>s</sup> .3	28 <sup>s</sup> .40	0 <sup>s</sup> .25	71 <sup>s</sup> .6	1 <sup>s</sup> .5
Oct.	8	9 <sup>s</sup> .25	0 <sup>s</sup> .40	49 <sup>s</sup> .1	2 <sup>s</sup> .1	28 <sup>s</sup> .65	0 <sup>s</sup> .27	70 <sup>s</sup> .1	1 <sup>s</sup> .7
	18	9 <sup>s</sup> .65	0 <sup>s</sup> .43	47 <sup>s</sup> .0	1 <sup>s</sup> .9	28 <sup>s</sup> .92	0 <sup>s</sup> .30	68 <sup>s</sup> .4	1 <sup>s</sup> .7
	28	10 <sup>s</sup> .08	0 <sup>s</sup> .46	45 <sup>s</sup> .1	1 <sup>s</sup> .7	29 <sup>s</sup> .22	0 <sup>s</sup> .33	66 <sup>s</sup> .7	1 <sup>s</sup> .7
Nov.	7	10 <sup>s</sup> .54	0 <sup>s</sup> .48	43 <sup>s</sup> .4	1 <sup>s</sup> .3	29 <sup>s</sup> .55	0 <sup>s</sup> .34	65 <sup>s</sup> .0	1 <sup>s</sup> .7
	17	11 <sup>s</sup> .02	0 <sup>s</sup> .49	42 <sup>s</sup> .1	1 <sup>s</sup> .0	29 <sup>s</sup> .89	0 <sup>s</sup> .36	63 <sup>s</sup> .3	1 <sup>s</sup> .6
	27	11 <sup>s</sup> .51	0 <sup>s</sup> .48	41 <sup>s</sup> .1	0 <sup>s</sup> .6	30 <sup>s</sup> .25	0 <sup>s</sup> .35	61 <sup>s</sup> .7	1 <sup>s</sup> .4
Dec.	7	11 <sup>s</sup> .99	0 <sup>s</sup> .46	40 <sup>s</sup> .5	0 <sup>s</sup> .1	30 <sup>s</sup> .60	0 <sup>s</sup> .34	60 <sup>s</sup> .3	1 <sup>s</sup> .3
	17	12 <sup>s</sup> .45	0 <sup>s</sup> .42	40 <sup>s</sup> .4	0 <sup>s</sup> .3	30 <sup>s</sup> .94	0 <sup>s</sup> .32	59 <sup>s</sup> .0	1 <sup>s</sup> .0
	27	12 <sup>s</sup> .87	0 <sup>s</sup> .38	40 <sup>s</sup> .7	0 <sup>s</sup> .7	31 <sup>s</sup> .26	0 <sup>s</sup> .28	58 <sup>s</sup> .0	0 <sup>s</sup> .8
	37	13 <sup>s</sup> .25	0 <sup>s</sup> .38	41 <sup>s</sup> .4	0 <sup>s</sup> .7	31 <sup>s</sup> .54	0 <sup>s</sup> .28	57 <sup>s</sup> .2	0 <sup>s</sup> .8



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Leonis. (Regulus)			$\gamma$ Leonis.			$\rho$ Leonis.		
	R.A.	Dec. North.		R.A.	Dec. North.		R.A.	Dec. North.	
	<sup>h</sup> 10 <sup>m</sup> 1	<sup>°</sup> 12 <sup>'</sup> 35		<sup>h</sup> 10 <sup>m</sup> 12	<sup>°</sup> 20 <sup>'</sup> 29		<sup>h</sup> 10 <sup>m</sup> 25	<sup>°</sup> 9 <sup>'</sup> 58	
Jan. 1	26 <sup>s</sup> .69	0 <sup>s</sup> .26	62 <sup>s</sup> .9	47 <sup>s</sup> .94	0 <sup>s</sup> .29	48 <sup>s</sup> .7	57 <sup>s</sup> .70	27 <sup>s</sup> .4	
11	26 <sup>s</sup> .95	0 <sup>s</sup> .22	61 <sup>s</sup> .6	48 <sup>s</sup> .23	0 <sup>s</sup> .24	47 <sup>s</sup> .7	57 <sup>s</sup> .98	25 <sup>s</sup> .9	
21	27 <sup>s</sup> .17	0 <sup>s</sup> .18	60 <sup>s</sup> .6	48 <sup>s</sup> .47	0 <sup>s</sup> .20	47 <sup>s</sup> .0	58 <sup>s</sup> .22	24 <sup>s</sup> .6	
31	27 <sup>s</sup> .35	0 <sup>s</sup> .13	59 <sup>s</sup> .8	48 <sup>s</sup> .67	0 <sup>s</sup> .15	46 <sup>s</sup> .6	58 <sup>s</sup> .41	23 <sup>s</sup> .6	
Feb. 10	27 <sup>s</sup> .48	0 <sup>s</sup> .08	59 <sup>s</sup> .2	48 <sup>s</sup> .82	0 <sup>s</sup> .09	46 <sup>s</sup> .6	58 <sup>s</sup> .56	22 <sup>s</sup> .9	
20	27 <sup>s</sup> .56	0 <sup>s</sup> .03	59 <sup>s</sup> .0	48 <sup>s</sup> .91	0 <sup>s</sup> .05	46 <sup>s</sup> .8	58 <sup>s</sup> .67	22 <sup>s</sup> .4	
Mar. 2	27 <sup>s</sup> .59	0 <sup>s</sup> .02	59 <sup>s</sup> .0	48 <sup>s</sup> .96	0 <sup>s</sup> .00	47 <sup>s</sup> .2	58 <sup>s</sup> .72	22 <sup>s</sup> .2	
12	27 <sup>s</sup> .57	0 <sup>s</sup> .05	59 <sup>s</sup> .2	48 <sup>s</sup> .96	0 <sup>s</sup> .05	47 <sup>s</sup> .9	58 <sup>s</sup> .73	22 <sup>s</sup> .2	
22	27 <sup>s</sup> .52	0 <sup>s</sup> .08	59 <sup>s</sup> .5	48 <sup>s</sup> .91	0 <sup>s</sup> .08	48 <sup>s</sup> .7	58 <sup>s</sup> .70	22 <sup>s</sup> .4	
Apr. 1	27 <sup>s</sup> .44	0 <sup>s</sup> .11	60 <sup>s</sup> .0	48 <sup>s</sup> .83	0 <sup>s</sup> .10	49 <sup>s</sup> .5	58 <sup>s</sup> .64	22 <sup>s</sup> .8	
11	27 <sup>s</sup> .33	0 <sup>s</sup> .13	60 <sup>s</sup> .6	48 <sup>s</sup> .73	0 <sup>s</sup> .12	50 <sup>s</sup> .5	58 <sup>s</sup> .55	23 <sup>s</sup> .3	
21	27 <sup>s</sup> .20	0 <sup>s</sup> .13	61 <sup>s</sup> .2	48 <sup>s</sup> .61	0 <sup>s</sup> .13	51 <sup>s</sup> .4	58 <sup>s</sup> .45	23 <sup>s</sup> .9	
May 1	27 <sup>s</sup> .07	0 <sup>s</sup> .13	61 <sup>s</sup> .9	48 <sup>s</sup> .48	0 <sup>s</sup> .14	52 <sup>s</sup> .3	58 <sup>s</sup> .33	24 <sup>s</sup> .5	
11	26 <sup>s</sup> .94	0 <sup>s</sup> .12	62 <sup>s</sup> .5	48 <sup>s</sup> .34	0 <sup>s</sup> .13	53 <sup>s</sup> .0	58 <sup>s</sup> .21	25 <sup>s</sup> .2	
21	26 <sup>s</sup> .82	0 <sup>s</sup> .12	63 <sup>s</sup> .2	48 <sup>s</sup> .21	0 <sup>s</sup> .12	53 <sup>s</sup> .7	58 <sup>s</sup> .09	25 <sup>s</sup> .9	
31	26 <sup>s</sup> .70	0 <sup>s</sup> .10	63 <sup>s</sup> .8	48 <sup>s</sup> .09	0 <sup>s</sup> .11	54 <sup>s</sup> .3	57 <sup>s</sup> .97	26 <sup>s</sup> .5	
June 10	26 <sup>s</sup> .60	0 <sup>s</sup> .09	64 <sup>s</sup> .3	47 <sup>s</sup> .98	0 <sup>s</sup> .09	54 <sup>s</sup> .7	57 <sup>s</sup> .86	27 <sup>s</sup> .1	
20	26 <sup>s</sup> .51	0 <sup>s</sup> .07	64 <sup>s</sup> .8	47 <sup>s</sup> .89	0 <sup>s</sup> .08	55 <sup>s</sup> .0	57 <sup>s</sup> .77	27 <sup>s</sup> .7	
30	26 <sup>s</sup> .44	0 <sup>s</sup> .04	65 <sup>s</sup> .2	47 <sup>s</sup> .81	0 <sup>s</sup> .05	55 <sup>s</sup> .1	57 <sup>s</sup> .70	28 <sup>s</sup> .1	
July 10	26 <sup>s</sup> .40	0 <sup>s</sup> .02	65 <sup>s</sup> .5	47 <sup>s</sup> .76	0 <sup>s</sup> .03	55 <sup>s</sup> .1	57 <sup>s</sup> .64	28 <sup>s</sup> .5	
20	26 <sup>s</sup> .38	0 <sup>s</sup> .01	65 <sup>s</sup> .7	47 <sup>s</sup> .73	0 <sup>s</sup> .00	54 <sup>s</sup> .9	57 <sup>s</sup> .60	28 <sup>s</sup> .8	
30	26 <sup>s</sup> .39	0 <sup>s</sup> .03	65 <sup>s</sup> .7	47 <sup>s</sup> .73	0 <sup>s</sup> .02	54 <sup>s</sup> .5	57 <sup>s</sup> .58	29 <sup>s</sup> .0	
Aug. 9	26 <sup>s</sup> .42	0 <sup>s</sup> .05	65 <sup>s</sup> .7	47 <sup>s</sup> .75	0 <sup>s</sup> .05	54 <sup>s</sup> .0	57 <sup>s</sup> .59	29 <sup>s</sup> .1	
19	26 <sup>s</sup> .47	0 <sup>s</sup> .09	65 <sup>s</sup> .5	47 <sup>s</sup> .80	0 <sup>s</sup> .09	53 <sup>s</sup> .4	57 <sup>s</sup> .62	29 <sup>s</sup> .0	
29	26 <sup>s</sup> .56	0 <sup>s</sup> .12	65 <sup>s</sup> .1	47 <sup>s</sup> .89	0 <sup>s</sup> .11	52 <sup>s</sup> .4	57 <sup>s</sup> .69	28 <sup>s</sup> .8	
Sept. 8	26 <sup>s</sup> .68	0 <sup>s</sup> .15	64 <sup>s</sup> .6	48 <sup>s</sup> .00	0 <sup>s</sup> .14	51 <sup>s</sup> .4	57 <sup>s</sup> .78	28 <sup>s</sup> .3	
18	26 <sup>s</sup> .83	0 <sup>s</sup> .18	63 <sup>s</sup> .8	48 <sup>s</sup> .14	0 <sup>s</sup> .18	50 <sup>s</sup> .1	57 <sup>s</sup> .90	27 <sup>s</sup> .7	
28	27 <sup>s</sup> .01	0 <sup>s</sup> .21	62 <sup>s</sup> .8	48 <sup>s</sup> .32	0 <sup>s</sup> .21	48 <sup>s</sup> .7	58 <sup>s</sup> .06	26 <sup>s</sup> .8	
Oct. 8	27 <sup>s</sup> .22	0 <sup>s</sup> .25	61 <sup>s</sup> .6	48 <sup>s</sup> .53	0 <sup>s</sup> .25	47 <sup>s</sup> .2	58 <sup>s</sup> .25	25 <sup>s</sup> .7	
18	27 <sup>s</sup> .47	0 <sup>s</sup> .27	60 <sup>s</sup> .3	48 <sup>s</sup> .78	0 <sup>s</sup> .27	45 <sup>s</sup> .5	58 <sup>s</sup> .47	24 <sup>s</sup> .3	
28	27 <sup>s</sup> .74	0 <sup>s</sup> .30	58 <sup>s</sup> .8	49 <sup>s</sup> .05	0 <sup>s</sup> .31	43 <sup>s</sup> .7	58 <sup>s</sup> .73	22 <sup>s</sup> .8	
Nov. 7	28 <sup>s</sup> .04	0 <sup>s</sup> .32	57 <sup>s</sup> .1	49 <sup>s</sup> .36	0 <sup>s</sup> .32	41 <sup>s</sup> .8	59 <sup>s</sup> .01	21 <sup>s</sup> .1	
17	28 <sup>s</sup> .36	0 <sup>s</sup> .33	55 <sup>s</sup> .3	49 <sup>s</sup> .68	0 <sup>s</sup> .34	39 <sup>s</sup> .9	59 <sup>s</sup> .32	19 <sup>s</sup> .3	
27	28 <sup>s</sup> .69	0 <sup>s</sup> .33	53 <sup>s</sup> .5	50 <sup>s</sup> .02	0 <sup>s</sup> .35	38 <sup>s</sup> .0	59 <sup>s</sup> .64	17 <sup>s</sup> .4	
Dec. 7	29 <sup>s</sup> .02	0 <sup>s</sup> .33	51 <sup>s</sup> .7	50 <sup>s</sup> .37	0 <sup>s</sup> .34	36 <sup>s</sup> .2	59 <sup>s</sup> .97	15 <sup>s</sup> .4	
17	29 <sup>s</sup> .35	0 <sup>s</sup> .31	49 <sup>s</sup> .9	50 <sup>s</sup> .71	0 <sup>s</sup> .33	34 <sup>s</sup> .6	60 <sup>s</sup> .30	13 <sup>s</sup> .5	
27	29 <sup>s</sup> .66	0 <sup>s</sup> .28	48 <sup>s</sup> .3	51 <sup>s</sup> .04	0 <sup>s</sup> .31	33 <sup>s</sup> .2	60 <sup>s</sup> .62	11 <sup>s</sup> .7	
37	29 <sup>s</sup> .94	0 <sup>s</sup> .28	46 <sup>s</sup> .9	51 <sup>s</sup> .35	0 <sup>s</sup> .31	32 <sup>s</sup> .1	60 <sup>s</sup> .92	10 <sup>s</sup> .1	



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\eta$ Argus.		$\iota$ Leonis.		$\alpha$ Ursæ Majoris.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 10 <sup>m</sup> 39	<sup>°</sup> 58 <sup>'</sup> 59	<sup>h</sup> 10 <sup>m</sup> 42	<sup>°</sup> 11 <sup>'</sup> 13	<sup>h</sup> 10 <sup>m</sup> 55	<sup>°</sup> 62 <sup>'</sup> 26
Jan. 1	62° 56' 0.40	44° 8' 3.1	25° 02' 0.29	55° 7' 1.5	40° 80' 0.54	54° 4' 0.4
11	62° 56' 0.33	47° 9' 3.3	25° 31' 0.25	54° 2' 1.3	41° 34' 0.49	54° 8' 1.0
21	63° 29' 0.27	51° 2' 3.6	25° 56' 0.21	52° 9' 1.0	41° 83' 0.42	55° 8' 1.5
31	63° 56' 0.19	54° 8' 3.7	25° 77' 0.17	51° 9' 0.7	42° 25' 0.34	57° 3' 1.9
Feb. 10	63° 75' 0.10	58° 5' 3.7	25° 94' 0.12	51° 2' 0.5	42° 59' 0.24	59° 2' 2.3
20	63° 85' 0.03	62° 2' 3.6	26° 06' 0.07	50° 7' 0.1	42° 83' 0.14	61° 5' 2.5
Mar. 2	63° 88' 0.04	65° 8' 3.4	26° 13' 0.03	50° 6' 0.1	42° 97' 0.05	64° 0' 2.7
12	63° 84' 0.10	69° 2' 3.2	26° 16' 0.01	50° 7' 0.3	43° 02' 0.04	66° 7' 2.7
Apr. 22	63° 74' 0.16	72° 4' 2.9	26° 15' 0.05	51° 0' 0.4	42° 98' 0.13	69° 4' 2.6
1	63° 58' 0.22	75° 3' 2.6	26° 10' 0.08	51° 4' 0.6	42° 85' 0.19	72° 0' 2.4
11	63° 36' 0.26	77° 9' 2.2	26° 02' 0.10	52° 0' 0.7	42° 66' 0.25	74° 4' 2.2
21	63° 10' 0.28	80° 1' 1.7	25° 92' 0.11	52° 7' 0.7	42° 41' 0.29	76° 6' 1.8
May 1	62° 82' 0.31	81° 8' 1.3	25° 81' 0.11	53° 4' 0.7	42° 12' 0.33	78° 4' 1.4
11	62° 51' 0.33	83° 1' 0.8	25° 70' 0.12	54° 1' 0.7	41° 79' 0.34	79° 8' 1.0
21	62° 18' 0.33	83° 9' 0.3	25° 58' 0.12	54° 8' 0.7	41° 45' 0.33	80° 8' 0.4
31	61° 85' 0.32	84° 2' 0.2	25° 46' 0.10	55° 5' 0.6	41° 12' 0.33	81° 2' 0.0
June 10	61° 53' 0.32	84° 0' 0.7	25° 36' 0.10	56° 1' 0.5	40° 79' 0.31	81° 2' 0.5
20	61° 21' 0.30	83° 3' 1.2	25° 26' 0.08	56° 6' 0.5	40° 48' 0.27	80° 7' 1.0
30	60° 91' 0.27	82° 1' 1.6	25° 18' 0.07	57° 1' 0.4	40° 21' 0.24	79° 7' 1.4
July 10	60° 64' 0.24	80° 5' 2.0	25° 11' 0.05	57° 5' 0.2	39° 97' 0.20	78° 3' 1.8
20	60° 40' 0.20	78° 5' 2.4	25° 06' 0.03	57° 7' 0.1	39° 77' 0.15	76° 5' 2.2
30	60° 20' 0.14	76° 1' 2.6	25° 03' 0.01	57° 8' 0.0	39° 62' 0.10	74° 3' 2.5
Aug. 9	60° 06' 0.09	73° 5' 2.9	25° 02' 0.02	57° 8' 0.1	39° 52' 0.04	71° 8' 2.8
19	59° 97' 0.03	70° 6' 2.9	25° 04' 0.04	57° 7' 0.4	39° 48' 0.02	69° 0' 2.9
Sept. 29	59° 94' 0.05	67° 7' 3.0	25° 08' 0.08	57° 3' 0.6	39° 50' 0.10	66° 1' 3.3
8	59° 99' 0.12	64° 7' 2.7	25° 16' 0.11	56° 7' 0.7	39° 60' 0.16	62° 6' 3.3
18	60° 11' 0.19	62° 0' 2.4	25° 27' 0.14	56° 0' 1.0	39° 76' 0.22	59° 3' 3.3
28	60° 30' 0.27	59° 6' 2.1	25° 41' 0.17	55° 0' 1.2	39° 98' 0.29	56° 0' 3.2
Oct. 8	60° 57' 0.35	57° 5' 1.7	25° 58' 0.21	53° 8' 1.4	40° 27' 0.36	52° 8' 3.2
18	60° 92' 0.39	55° 8' 1.2	25° 79' 0.25	52° 4' 1.6	40° 63' 0.43	49° 6' 3.0
28	61° 31' 0.45	54° 6' 0.5	26° 04' 0.28	50° 8' 1.8	41° 06' 0.49	46° 6' 2.7
Nov. 7	61° 76' 0.49	54° 1' 0.0	26° 32' 0.30	49° 0' 1.9	41° 55' 0.54	43° 9' 2.4
17	62° 25' 0.51	54° 1' 0.7	26° 62' 0.32	47° 1' 2.0	42° 09' 0.58	41° 5' 2.0
27	62° 76' 0.51	54° 8' 1.3	26° 94' 0.33	45° 1' 2.0	42° 67' 0.60	39° 5' 1.5
Dec. 7	63° 27' 0.50	56° 1' 1.9	27° 27' 0.34	43° 1' 2.0	43° 27' 0.61	38° 0' 1.0
17	63° 77' 0.48	58° 0' 2.4	27° 61' 0.32	41° 1' 1.8	43° 88' 0.60	37° 0' 0.5
27	64° 25' 0.43	60° 4' 2.9	27° 93' 0.31	39° 3' 1.6	44° 48' 0.57	36° 5' 0.2
37	64° 68' 0.43	63° 3' 3.8	28° 24' 0.31	37° 7' 1.6	45° 05' 0.57	36° 7' 0.2



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\chi$ Leonis.		$\delta$ Leonis.		$\delta$ Hydræ et Crateris.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. South.
	<sup>h</sup> 10 <sup>m</sup> 58	<sup>°</sup> 8 <sup>'</sup> 1	<sup>h</sup> 11 <sup>m</sup> 7	<sup>°</sup> 21 <sup>'</sup> 13	<sup>h</sup> 11 <sup>m</sup> 12	<sup>°</sup> 14 <sup>'</sup> 4
Jan. 1	18 <sup>s</sup> 26 <sup>s</sup>	77 <sup>"</sup> 1 <sup>"</sup>	11 <sup>s</sup> 06 <sup>s</sup>	63 <sup>"</sup> 7 <sup>"</sup>	50 <sup>s</sup> 26 <sup>s</sup>	24 <sup>"</sup> 5 <sup>"</sup>
11	18 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 29	75 <sup>"</sup> 3 <sup>"</sup> 1 <sup>"</sup> 8	11 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 32	62 <sup>"</sup> 4 <sup>"</sup> 1 <sup>"</sup> 3	50 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 29	26 <sup>"</sup> 8 <sup>"</sup> 2 <sup>"</sup> 3
21	18 <sup>s</sup> 81 <sup>s</sup> 0 <sup>s</sup> 26	73 <sup>"</sup> 9 <sup>"</sup> 1 <sup>"</sup> 4	11 <sup>s</sup> 66 <sup>s</sup> 0 <sup>s</sup> 28	61 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 9	50 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 27	29 <sup>"</sup> 2 <sup>"</sup> 4 <sup>"</sup>
31	19 <sup>s</sup> 03 <sup>s</sup> 0 <sup>s</sup> 22	72 <sup>"</sup> 7 <sup>"</sup> 1 <sup>"</sup> 2	11 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 25	60 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 6	51 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 22	31 <sup>"</sup> 5 <sup>"</sup> 2 <sup>"</sup> 3
		0 <sup>"</sup> 18		0 <sup>"</sup> 20		0 <sup>"</sup> 19
Feb. 10	19 <sup>s</sup> 21 <sup>s</sup>	71 <sup>"</sup> 7 <sup>"</sup>	12 <sup>s</sup> 11 <sup>s</sup>	60 <sup>"</sup> 7 <sup>"</sup>	51 <sup>s</sup> 23 <sup>s</sup>	33 <sup>"</sup> 6 <sup>"</sup>
20	19 <sup>s</sup> 35 <sup>s</sup> 0 <sup>s</sup> 14	71 <sup>"</sup> 0 <sup>"</sup> 0 <sup>"</sup> 7	12 <sup>s</sup> 26 <sup>s</sup> 0 <sup>s</sup> 15	60 <sup>"</sup> 8 <sup>"</sup> 0 <sup>"</sup> 1	51 <sup>s</sup> 37 <sup>s</sup> 0 <sup>s</sup> 14	35 <sup>"</sup> 5 <sup>"</sup> 1 <sup>"</sup> 9
Mar. 2	19 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 09	70 <sup>"</sup> 6 <sup>"</sup> 0 <sup>"</sup> 4	12 <sup>s</sup> 36 <sup>s</sup> 0 <sup>s</sup> 10	61 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 4	51 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 10	37 <sup>"</sup> 2 <sup>"</sup> 1 <sup>"</sup> 7
12	19 <sup>s</sup> 48 <sup>s</sup> 0 <sup>s</sup> 04	70 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 1	12 <sup>s</sup> 42 <sup>s</sup> 0 <sup>s</sup> 06	61 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 7	51 <sup>s</sup> 52 <sup>s</sup> 0 <sup>s</sup> 05	38 <sup>"</sup> 7 <sup>"</sup> 1 <sup>"</sup> 5
		0 <sup>"</sup> 00		0 <sup>"</sup> 01		0 <sup>"</sup> 01
22	19 <sup>s</sup> 48 <sup>s</sup>	70 <sup>"</sup> 6 <sup>"</sup>	12 <sup>s</sup> 43 <sup>s</sup>	62 <sup>"</sup> 7 <sup>"</sup>	51 <sup>s</sup> 53 <sup>s</sup>	40 <sup>"</sup> 0 <sup>"</sup>
Apr. 1	19 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 04	70 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 3	12 <sup>s</sup> 40 <sup>s</sup> 0 <sup>s</sup> 03	63 <sup>"</sup> 7 <sup>"</sup> 1 <sup>"</sup> 0	51 <sup>s</sup> 51 <sup>s</sup> 0 <sup>s</sup> 02	41 <sup>"</sup> 0 <sup>"</sup> 1 <sup>"</sup> 0
11	19 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 06	71 <sup>"</sup> 4 <sup>"</sup> 0 <sup>"</sup> 5	12 <sup>s</sup> 34 <sup>s</sup> 0 <sup>s</sup> 06	64 <sup>"</sup> 8 <sup>"</sup> 1 <sup>"</sup> 1	51 <sup>s</sup> 46 <sup>s</sup> 0 <sup>s</sup> 05	41 <sup>"</sup> 7 <sup>"</sup> 0 <sup>"</sup> 7
21	19 <sup>s</sup> 30 <sup>s</sup> 0 <sup>s</sup> 08	71 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 5	12 <sup>s</sup> 26 <sup>s</sup> 0 <sup>s</sup> 08	66 <sup>"</sup> 0 <sup>"</sup> 1 <sup>"</sup> 2	51 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 08	42 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 5
		0 <sup>"</sup> 10		0 <sup>"</sup> 10		0 <sup>"</sup> 10
May 1	19 <sup>s</sup> 20 <sup>s</sup>	72 <sup>"</sup> 5 <sup>"</sup>	12 <sup>s</sup> 16 <sup>s</sup>	67 <sup>"</sup> 1 <sup>"</sup>	51 <sup>s</sup> 28 <sup>s</sup>	42 <sup>"</sup> 4 <sup>"</sup>
11	19 <sup>s</sup> 09 <sup>s</sup> 0 <sup>s</sup> 11	73 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 7	12 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 12	68 <sup>"</sup> 1 <sup>"</sup> 1 <sup>"</sup> 0	51 <sup>s</sup> 18 <sup>s</sup> 0 <sup>s</sup> 10	42 <sup>"</sup> 4 <sup>"</sup> 0 <sup>"</sup> 0
21	18 <sup>s</sup> 98 <sup>s</sup> 0 <sup>s</sup> 11	73 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 7	11 <sup>s</sup> 92 <sup>s</sup> 0 <sup>s</sup> 12	69 <sup>"</sup> 0 <sup>"</sup> 0 <sup>"</sup> 9	51 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 11	42 <sup>"</sup> 4 <sup>"</sup> 0 <sup>"</sup> 1
31	18 <sup>s</sup> 86 <sup>s</sup> 0 <sup>s</sup> 12	74 <sup>"</sup> 6 <sup>"</sup> 0 <sup>"</sup> 7	11 <sup>s</sup> 80 <sup>s</sup> 0 <sup>s</sup> 12	69 <sup>"</sup> 8 <sup>"</sup> 0 <sup>"</sup> 8	51 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 12	42 <sup>"</sup> 3 <sup>"</sup> 0 <sup>"</sup> 4
		0 <sup>"</sup> 10		0 <sup>"</sup> 12		0 <sup>"</sup> 11
June 10	18 <sup>s</sup> 76 <sup>s</sup>	75 <sup>"</sup> 2 <sup>"</sup>	11 <sup>s</sup> 68 <sup>s</sup>	70 <sup>"</sup> 4 <sup>"</sup>	50 <sup>s</sup> 84 <sup>s</sup>	41 <sup>"</sup> 4 <sup>"</sup>
20	18 <sup>s</sup> 66 <sup>s</sup> 0 <sup>s</sup> 10	75 <sup>"</sup> 8 <sup>"</sup> 0 <sup>"</sup> 6	11 <sup>s</sup> 57 <sup>s</sup> 0 <sup>s</sup> 11	70 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 5	50 <sup>s</sup> 72 <sup>s</sup> 0 <sup>s</sup> 12	40 <sup>"</sup> 6 <sup>"</sup> 0 <sup>"</sup> 8
30	18 <sup>s</sup> 57 <sup>s</sup> 0 <sup>s</sup> 09	76 <sup>"</sup> 4 <sup>"</sup> 0 <sup>"</sup> 6	11 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 10	71 <sup>"</sup> 1 <sup>"</sup> 0 <sup>"</sup> 2	50 <sup>s</sup> 62 <sup>s</sup> 0 <sup>s</sup> 10	39 <sup>"</sup> 7 <sup>"</sup> 0 <sup>"</sup> 9
July 10	18 <sup>s</sup> 49 <sup>s</sup> 0 <sup>s</sup> 08	76 <sup>"</sup> 9 <sup>"</sup> 0 <sup>"</sup> 5	11 <sup>s</sup> 39 <sup>s</sup> 0 <sup>s</sup> 08	71 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 1	50 <sup>s</sup> 53 <sup>s</sup> 0 <sup>s</sup> 09	38 <sup>"</sup> 8 <sup>"</sup> 0 <sup>"</sup> 9
		0 <sup>"</sup> 06		0 <sup>"</sup> 07		0 <sup>"</sup> 08
20	18 <sup>s</sup> 43 <sup>s</sup>	77 <sup>"</sup> 2 <sup>"</sup>	11 <sup>s</sup> 32 <sup>s</sup>	71 <sup>"</sup> 1 <sup>"</sup>	50 <sup>s</sup> 45 <sup>s</sup>	37 <sup>"</sup> 7 <sup>"</sup>
30	18 <sup>s</sup> 39 <sup>s</sup> 0 <sup>s</sup> 04	77 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 3	11 <sup>s</sup> 27 <sup>s</sup> 0 <sup>s</sup> 05	70 <sup>"</sup> 8 <sup>"</sup> 0 <sup>"</sup> 3	50 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 07	36 <sup>"</sup> 6 <sup>"</sup> 1 <sup>"</sup> 1
Aug. 9	18 <sup>s</sup> 36 <sup>s</sup> 0 <sup>s</sup> 03	77 <sup>"</sup> 6 <sup>"</sup> 0 <sup>"</sup> 1	11 <sup>s</sup> 24 <sup>s</sup> 0 <sup>s</sup> 03	70 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 6	50 <sup>s</sup> 33 <sup>s</sup> 0 <sup>s</sup> 05	35 <sup>"</sup> 4 <sup>"</sup> 1 <sup>"</sup> 2
19	18 <sup>s</sup> 36 <sup>s</sup> 0 <sup>s</sup> 00	77 <sup>"</sup> 6 <sup>"</sup> 0 <sup>"</sup> 0	11 <sup>s</sup> 24 <sup>s</sup> 0 <sup>s</sup> 01	70 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 7	50 <sup>s</sup> 33 <sup>s</sup> 0 <sup>s</sup> 02	35 <sup>"</sup> 4 <sup>"</sup> 1 <sup>"</sup> 1
		0 <sup>"</sup> 03		0 <sup>"</sup> 02		0 <sup>"</sup> 00
29	18 <sup>s</sup> 39 <sup>s</sup>	77 <sup>"</sup> 5 <sup>"</sup>	11 <sup>s</sup> 25 <sup>s</sup>	68 <sup>"</sup> 5 <sup>"</sup>	50 <sup>s</sup> 31 <sup>s</sup>	33 <sup>"</sup> 2 <sup>"</sup>
Sept. 8	18 <sup>s</sup> 45 <sup>s</sup> 0 <sup>s</sup> 06	77 <sup>"</sup> 1 <sup>"</sup> 0 <sup>"</sup> 4	{11:25} 0 <sup>s</sup> 05	{68:5} 1 <sup>"</sup> 2	50 <sup>s</sup> 31 <sup>s</sup> 0 <sup>s</sup> 03	33 <sup>"</sup> 2 <sup>"</sup> 0 <sup>"</sup> 9
18	18 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 09	76 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 6	{11:25} 0 <sup>s</sup> 09	{68:5} 1 <sup>"</sup> 3	50 <sup>s</sup> 34 <sup>s</sup> 0 <sup>s</sup> 08	32 <sup>"</sup> 3 <sup>"</sup> 0 <sup>"</sup> 8
28	18 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 12	76 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 9	11 <sup>s</sup> 39 <sup>s</sup> 0 <sup>s</sup> 12	65 <sup>"</sup> 9 <sup>"</sup> 1 <sup>"</sup> 6	50 <sup>s</sup> 42 <sup>s</sup> 0 <sup>s</sup> 10	31 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 4
		0 <sup>"</sup> 16		0 <sup>"</sup> 16		0 <sup>"</sup> 14
Oct. 8	18 <sup>s</sup> 82 <sup>s</sup>	74 <sup>"</sup> 6 <sup>"</sup>	11 <sup>s</sup> 67 <sup>s</sup>	62 <sup>"</sup> 5 <sup>"</sup>	50 <sup>s</sup> 66 <sup>s</sup>	30 <sup>"</sup> 9 <sup>"</sup>
18	19 <sup>s</sup> 02 <sup>s</sup> 0 <sup>s</sup> 20	73 <sup>"</sup> 3 <sup>"</sup> 1 <sup>"</sup> 3	11 <sup>s</sup> 87 <sup>s</sup> 0 <sup>s</sup> 20	60 <sup>"</sup> 5 <sup>"</sup> 2 <sup>"</sup> 0	50 <sup>s</sup> 85 <sup>s</sup> 0 <sup>s</sup> 19	31 <sup>"</sup> 0 <sup>"</sup> 0 <sup>"</sup> 1
28	19 <sup>s</sup> 25 <sup>s</sup> 0 <sup>s</sup> 23	71 <sup>"</sup> 7 <sup>"</sup> 1 <sup>"</sup> 6	12 <sup>s</sup> 10 <sup>s</sup> 0 <sup>s</sup> 23	58 <sup>"</sup> 5 <sup>"</sup> 2 <sup>"</sup> 0	51 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 22	31 <sup>"</sup> 5 <sup>"</sup> 0 <sup>"</sup> 5
Nov. 7	19 <sup>s</sup> 51 <sup>s</sup> 0 <sup>s</sup> 26	70 <sup>"</sup> 0 <sup>"</sup> 1 <sup>"</sup> 7	12 <sup>s</sup> 37 <sup>s</sup> 0 <sup>s</sup> 27	56 <sup>"</sup> 3 <sup>"</sup> 2 <sup>"</sup> 2	51 <sup>s</sup> 33 <sup>s</sup> 0 <sup>s</sup> 26	32 <sup>"</sup> 4 <sup>"</sup> 0 <sup>"</sup> 9
		0 <sup>"</sup> 29		0 <sup>"</sup> 30		0 <sup>"</sup> 29
17	19 <sup>s</sup> 80 <sup>s</sup>	68 <sup>"</sup> 1 <sup>"</sup>	12 <sup>s</sup> 67 <sup>s</sup>	54 <sup>"</sup> 1 <sup>"</sup>	51 <sup>s</sup> 62 <sup>s</sup>	33 <sup>"</sup> 7 <sup>"</sup>
27	20 <sup>s</sup> 12 <sup>s</sup> 0 <sup>s</sup> 32	66 <sup>"</sup> 1 <sup>"</sup> 2 <sup>"</sup> 0	13 <sup>s</sup> 00 <sup>s</sup> 0 <sup>s</sup> 33	51 <sup>"</sup> 9 <sup>"</sup> 2 <sup>"</sup> 2	51 <sup>s</sup> 93 <sup>s</sup> 0 <sup>s</sup> 31	35 <sup>"</sup> 2 <sup>"</sup> 1 <sup>"</sup> 5
Dec. 7	20 <sup>s</sup> 45 <sup>s</sup> 0 <sup>s</sup> 33	64 <sup>"</sup> 1 <sup>"</sup> 2 <sup>"</sup> 0	13 <sup>s</sup> 35 <sup>s</sup> 0 <sup>s</sup> 35	49 <sup>"</sup> 8 <sup>"</sup> 2 <sup>"</sup> 1	52 <sup>s</sup> 26 <sup>s</sup> 0 <sup>s</sup> 33	37 <sup>"</sup> 1 <sup>"</sup> 1 <sup>"</sup> 9
17	20 <sup>s</sup> 78 <sup>s</sup> 0 <sup>s</sup> 33	62 <sup>"</sup> 1 <sup>"</sup> 2 <sup>"</sup> 0	13 <sup>s</sup> 70 <sup>s</sup> 0 <sup>s</sup> 35	47 <sup>"</sup> 9 <sup>"</sup> 1 <sup>"</sup> 9	52 <sup>s</sup> 59 <sup>s</sup> 0 <sup>s</sup> 33	39 <sup>"</sup> 2 <sup>"</sup> 2 <sup>"</sup> 1
		0 <sup>"</sup> 33		0 <sup>"</sup> 35		0 <sup>"</sup> 33
27	21 <sup>s</sup> 11 <sup>s</sup>	60 <sup>"</sup> 1 <sup>"</sup> 1 <sup>"</sup> 8	14 <sup>s</sup> 05 <sup>s</sup>	46 <sup>"</sup> 2 <sup>"</sup>	52 <sup>s</sup> 92 <sup>s</sup> 0 <sup>s</sup> 32	41 <sup>"</sup> 4 <sup>"</sup> 2 <sup>"</sup> 2
37	21 <sup>s</sup> 43 <sup>s</sup> 0 <sup>s</sup> 32	58 <sup>"</sup> 3 <sup>"</sup> 1 <sup>"</sup> 8	14 <sup>s</sup> 38 <sup>s</sup> 0 <sup>s</sup> 33	44 <sup>"</sup> 8 <sup>"</sup> 1 <sup>"</sup> 4	53 <sup>s</sup> 24 <sup>s</sup> 0 <sup>s</sup> 32	43 <sup>"</sup> 8 <sup>"</sup> 2 <sup>"</sup> 4



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Leonis.		$\beta$ Leonis.		$\gamma$ Ursæ Majoris.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 11 <sup>m</sup> 30	<sup>°</sup> 0 <sup>'</sup> 6	<sup>h</sup> 11 <sup>m</sup> 42	<sup>°</sup> 15 <sup>'</sup> 17	<sup>h</sup> 11 <sup>m</sup> 46	<sup>°</sup> 54 <sup>'</sup> 24
Jan. 1	17 <sup>s</sup> .10 <sup>s</sup> 0 <sup>s</sup> .30	18 <sup>s</sup> .7 <sup>s</sup> 2 <sup>s</sup> .0	24 <sup>s</sup> .97 <sup>s</sup> 0 <sup>s</sup> .32	54 <sup>s</sup> .0 <sup>s</sup> 1 <sup>s</sup> .7	58 <sup>s</sup> .10 <sup>s</sup> 0 <sup>s</sup> .48	51 <sup>s</sup> .3 <sup>s</sup> 0 <sup>s</sup> .5
11	17 <sup>s</sup> .40 0 <sup>s</sup> .28	20 <sup>s</sup> .7 1 <sup>s</sup> .8	25 <sup>s</sup> .29 0 <sup>s</sup> .29	52 <sup>s</sup> .3 1 <sup>s</sup> .3	58 <sup>s</sup> .58 0 <sup>s</sup> .45	50 <sup>s</sup> .8 0 <sup>s</sup> .1
21	17 <sup>s</sup> .68 0 <sup>s</sup> .24	22 <sup>s</sup> .5 1 <sup>s</sup> .7	25 <sup>s</sup> .58 0 <sup>s</sup> .26	51 <sup>s</sup> .0 1 <sup>s</sup> .0	59 <sup>s</sup> .03 0 <sup>s</sup> .40	50 <sup>s</sup> .9 0 <sup>s</sup> .7
31	17 <sup>s</sup> .92 0 <sup>s</sup> .21	24 <sup>s</sup> .2 1 <sup>s</sup> .5	25 <sup>s</sup> .84 0 <sup>s</sup> .23	50 <sup>s</sup> .0 0 <sup>s</sup> .7	59 <sup>s</sup> .43 0 <sup>s</sup> .35	51 <sup>s</sup> .6 1 <sup>s</sup> .2
Feb. 10	18 <sup>s</sup> .13 0 <sup>s</sup> .16	25 <sup>s</sup> .7 1 <sup>s</sup> .2	26 <sup>s</sup> .07 0 <sup>s</sup> .18	49 <sup>s</sup> .3 0 <sup>s</sup> .4	59 <sup>s</sup> .78 0 <sup>s</sup> .28	52 <sup>s</sup> .8 1 <sup>s</sup> .6
20	18 <sup>s</sup> .29 0 <sup>s</sup> .11	26 <sup>s</sup> .9 0 <sup>s</sup> .9	26 <sup>s</sup> .25 0 <sup>s</sup> .13	48 <sup>s</sup> .9 0 <sup>s</sup> .0	60 <sup>s</sup> .06 0 <sup>s</sup> .20	54 <sup>s</sup> .4 2 <sup>s</sup> .0
Mar. 2	18 <sup>s</sup> .40 0 <sup>s</sup> .08	27 <sup>s</sup> .8 0 <sup>s</sup> .7	26 <sup>s</sup> .38 0 <sup>s</sup> .09	48 <sup>s</sup> .9 0 <sup>s</sup> .3	60 <sup>s</sup> .26 0 <sup>s</sup> .14	56 <sup>s</sup> .4 2 <sup>s</sup> .3
12	18 <sup>s</sup> .48 0 <sup>s</sup> .03	28 <sup>s</sup> .5 0 <sup>s</sup> .4	26 <sup>s</sup> .47 0 <sup>s</sup> .05	49 <sup>s</sup> .2 0 <sup>s</sup> .5	60 <sup>s</sup> .40 0 <sup>s</sup> .06	58 <sup>s</sup> .7 2 <sup>s</sup> .5
22	18 <sup>s</sup> .51 0 <sup>s</sup> .00	28 <sup>s</sup> .9 0 <sup>s</sup> .2	26 <sup>s</sup> .52 0 <sup>s</sup> .01	49 <sup>s</sup> .7 0 <sup>s</sup> .7	60 <sup>s</sup> .46 0 <sup>s</sup> .01	61 <sup>s</sup> .2 2 <sup>s</sup> .6
Apr. 1	18 <sup>s</sup> .51 0 <sup>s</sup> .03	29 <sup>s</sup> .1 0 <sup>s</sup> .1	26 <sup>s</sup> .53 0 <sup>s</sup> .03	50 <sup>s</sup> .4 0 <sup>s</sup> .9	60 <sup>s</sup> .45 0 <sup>s</sup> .07	63 <sup>s</sup> .8 2 <sup>s</sup> .5
11	18 <sup>s</sup> .48 0 <sup>s</sup> .06	29 <sup>s</sup> .0 0 <sup>s</sup> .2	26 <sup>s</sup> .50 0 <sup>s</sup> .05	51 <sup>s</sup> .3 0 <sup>s</sup> .9	60 <sup>s</sup> .38 0 <sup>s</sup> .12	66 <sup>s</sup> .3 2 <sup>s</sup> .4
21	18 <sup>s</sup> .42 0 <sup>s</sup> .08	28 <sup>s</sup> .8 0 <sup>s</sup> .3	26 <sup>s</sup> .45 0 <sup>s</sup> .08	52 <sup>s</sup> .2 1 <sup>s</sup> .0	60 <sup>s</sup> .26 0 <sup>s</sup> .17	68 <sup>s</sup> .7 2 <sup>s</sup> .2
May 1	18 <sup>s</sup> .34 0 <sup>s</sup> .09	28 <sup>s</sup> .5 0 <sup>s</sup> .4	26 <sup>s</sup> .37 0 <sup>s</sup> .09	53 <sup>s</sup> .2 1 <sup>s</sup> .0	60 <sup>s</sup> .09 0 <sup>s</sup> .20	70 <sup>s</sup> .9 1 <sup>s</sup> .9
11	18 <sup>s</sup> .25 0 <sup>s</sup> .10	28 <sup>s</sup> .1 0 <sup>s</sup> .6	26 <sup>s</sup> .28 0 <sup>s</sup> .10	54 <sup>s</sup> .2 1 <sup>s</sup> .0	59 <sup>s</sup> .89 0 <sup>s</sup> .23	72 <sup>s</sup> .8 1 <sup>s</sup> .4
21	18 <sup>s</sup> .15 0 <sup>s</sup> .10	27 <sup>s</sup> .5 0 <sup>s</sup> .6	26 <sup>s</sup> .18 0 <sup>s</sup> .10	55 <sup>s</sup> .2 0 <sup>s</sup> .9	59 <sup>s</sup> .66 0 <sup>s</sup> .24	74 <sup>s</sup> .2 1 <sup>s</sup> .1
31	18 <sup>s</sup> .05 0 <sup>s</sup> .10	26 <sup>s</sup> .9 0 <sup>s</sup> .6	26 <sup>s</sup> .08 0 <sup>s</sup> .11	56 <sup>s</sup> .1 0 <sup>s</sup> .7	59 <sup>s</sup> .42 0 <sup>s</sup> .24	75 <sup>s</sup> .3 0 <sup>s</sup> .7
June 10	17 <sup>s</sup> .95 0 <sup>s</sup> .10	26 <sup>s</sup> .3 0 <sup>s</sup> .7	25 <sup>s</sup> .97 0 <sup>s</sup> .11	56 <sup>s</sup> .8 0 <sup>s</sup> .6	59 <sup>s</sup> .18 0 <sup>s</sup> .25	76 <sup>s</sup> .0 0 <sup>s</sup> .2
20	17 <sup>s</sup> .85 0 <sup>s</sup> .10	25 <sup>s</sup> .6 0 <sup>s</sup> .6	25 <sup>s</sup> .86 0 <sup>s</sup> .11	57 <sup>s</sup> .4 0 <sup>s</sup> .5	58 <sup>s</sup> .93 0 <sup>s</sup> .23	76 <sup>s</sup> .2 0 <sup>s</sup> .2
30	17 <sup>s</sup> .75 0 <sup>s</sup> .09	25 <sup>s</sup> .0 0 <sup>s</sup> .7	25 <sup>s</sup> .75 0 <sup>s</sup> .10	57 <sup>s</sup> .9 0 <sup>s</sup> .3	58 <sup>s</sup> .70 0 <sup>s</sup> .22	76 <sup>s</sup> .0 0 <sup>s</sup> .7
July 10	17 <sup>s</sup> .66 0 <sup>s</sup> .08	24 <sup>s</sup> .3 0 <sup>s</sup> .6	25 <sup>s</sup> .65 0 <sup>s</sup> .08	58 <sup>s</sup> .2 0 <sup>s</sup> .2	58 <sup>s</sup> .48 0 <sup>s</sup> .19	75 <sup>s</sup> .3 1 <sup>s</sup> .1
20	17 <sup>s</sup> .58 0 <sup>s</sup> .07	23 <sup>s</sup> .7 0 <sup>s</sup> .6	25 <sup>s</sup> .57 0 <sup>s</sup> .08	58 <sup>s</sup> .4 0 <sup>s</sup> .0	58 <sup>s</sup> .29 0 <sup>s</sup> .17	74 <sup>s</sup> .2 1 <sup>s</sup> .5
30	17 <sup>s</sup> .51 0 <sup>s</sup> .05	23 <sup>s</sup> .1 0 <sup>s</sup> .5	25 <sup>s</sup> .49 0 <sup>s</sup> .06	58 <sup>s</sup> .4 0 <sup>s</sup> .2	58 <sup>s</sup> .12 0 <sup>s</sup> .14	72 <sup>s</sup> .7 1 <sup>s</sup> .9
Aug. 9	17 <sup>s</sup> .46 0 <sup>s</sup> .03	22 <sup>s</sup> .6 0 <sup>s</sup> .4	25 <sup>s</sup> .43 0 <sup>s</sup> .04	58 <sup>s</sup> .2 0 <sup>s</sup> .4	57 <sup>s</sup> .98 0 <sup>s</sup> .10	70 <sup>s</sup> .8 2 <sup>s</sup> .2
19	17 <sup>s</sup> .43 0 <sup>s</sup> .01	22 <sup>s</sup> .2 0 <sup>s</sup> .3	25 <sup>s</sup> .39 0 <sup>s</sup> .02	57 <sup>s</sup> .8 0 <sup>s</sup> .6	57 <sup>s</sup> .88 0 <sup>s</sup> .06	68 <sup>s</sup> .6 2 <sup>s</sup> .6
29	17 <sup>s</sup> .42 0 <sup>s</sup> .02	21 <sup>s</sup> .9 0 <sup>s</sup> .1	25 <sup>s</sup> .37 0 <sup>s</sup> .01	57 <sup>s</sup> .2 0 <sup>s</sup> .8	57 <sup>s</sup> .82 0 <sup>s</sup> .02	66 <sup>s</sup> .0 2 <sup>s</sup> .8
Sept. 8	17 <sup>s</sup> .44 0 <sup>s</sup> .06	21 <sup>s</sup> .8 0 <sup>s</sup> .2	25 <sup>s</sup> .38 0 <sup>s</sup> .05	56 <sup>s</sup> .4 1 <sup>s</sup> .2	57 <sup>s</sup> .80 0 <sup>s</sup> .03	63 <sup>s</sup> .2 3 <sup>s</sup> .0
18	17 <sup>s</sup> .50 0 <sup>s</sup> .09	22 <sup>s</sup> .0 0 <sup>s</sup> .4	25 <sup>s</sup> .43 0 <sup>s</sup> .08	55 <sup>s</sup> .2 1 <sup>s</sup> .3	57 <sup>s</sup> .83 0 <sup>s</sup> .10	60 <sup>s</sup> .2 3 <sup>s</sup> .5
28	17 <sup>s</sup> .59 0 <sup>s</sup> .13	22 <sup>s</sup> .4 0 <sup>s</sup> .6	25 <sup>s</sup> .51 0 <sup>s</sup> .12	53 <sup>s</sup> .9 1 <sup>s</sup> .5	57 <sup>s</sup> .93 0 <sup>s</sup> .15	56 <sup>s</sup> .7 3 <sup>s</sup> .3
Oct. 8	17 <sup>s</sup> .72 0 <sup>s</sup> .17	23 <sup>s</sup> .0 0 <sup>s</sup> .8	25 <sup>s</sup> .63 0 <sup>s</sup> .15	52 <sup>s</sup> .4 1 <sup>s</sup> .8	58 <sup>s</sup> .08 0 <sup>s</sup> .22	53 <sup>s</sup> .4 3 <sup>s</sup> .4
18	17 <sup>s</sup> .89 0 <sup>s</sup> .20	23 <sup>s</sup> .8 1 <sup>s</sup> .2	25 <sup>s</sup> .78 0 <sup>s</sup> .20	50 <sup>s</sup> .6 1 <sup>s</sup> .9	58 <sup>s</sup> .30 0 <sup>s</sup> .27	50 <sup>s</sup> .0 3 <sup>s</sup> .3
28	18 <sup>s</sup> .09 0 <sup>s</sup> .24	25 <sup>s</sup> .0 1 <sup>s</sup> .5	25 <sup>s</sup> .98 0 <sup>s</sup> .24	48 <sup>s</sup> .7 2 <sup>s</sup> .0	58 <sup>s</sup> .57 0 <sup>s</sup> .33	46 <sup>s</sup> .7 3 <sup>s</sup> .1
Nov. 7	18 <sup>s</sup> .33 0 <sup>s</sup> .28	26 <sup>s</sup> .5 1 <sup>s</sup> .7	26 <sup>s</sup> .22 0 <sup>s</sup> .27	46 <sup>s</sup> .7 2 <sup>s</sup> .2	58 <sup>s</sup> .90 0 <sup>s</sup> .39	43 <sup>s</sup> .6 2 <sup>s</sup> .9
17	18 <sup>s</sup> .61 0 <sup>s</sup> .30	28 <sup>s</sup> .2 1 <sup>s</sup> .8	26 <sup>s</sup> .49 0 <sup>s</sup> .30	44 <sup>s</sup> .5 2 <sup>s</sup> .3	59 <sup>s</sup> .29 0 <sup>s</sup> .43	40 <sup>s</sup> .7 2 <sup>s</sup> .6
27	18 <sup>s</sup> .91 0 <sup>s</sup> .32	30 <sup>s</sup> .0 2 <sup>s</sup> .0	26 <sup>s</sup> .79 0 <sup>s</sup> .33	42 <sup>s</sup> .2 2 <sup>s</sup> .2	59 <sup>s</sup> .72 0 <sup>s</sup> .47	38 <sup>s</sup> .1 2 <sup>s</sup> .1
Dec. 7	19 <sup>s</sup> .23 0 <sup>s</sup> .33	32 <sup>s</sup> .0 2 <sup>s</sup> .1	27 <sup>s</sup> .12 0 <sup>s</sup> .34	40 <sup>s</sup> .0 2 <sup>s</sup> .2	60 <sup>s</sup> .19 0 <sup>s</sup> .50	35 <sup>s</sup> .8 1 <sup>s</sup> .9
17	19 <sup>s</sup> .56 0 <sup>s</sup> .33	34 <sup>s</sup> .1 2 <sup>s</sup> .2	27 <sup>s</sup> .46 0 <sup>s</sup> .34	37 <sup>s</sup> .8 2 <sup>s</sup> .0	60 <sup>s</sup> .69 0 <sup>s</sup> .50	33 <sup>s</sup> .9 1 <sup>s</sup> .3
27	19 <sup>s</sup> .89 0 <sup>s</sup> .31	36 <sup>s</sup> .3 2 <sup>s</sup> .1	27 <sup>s</sup> .80 0 <sup>s</sup> .33	35 <sup>s</sup> .8 1 <sup>s</sup> .8	61 <sup>s</sup> .19 0 <sup>s</sup> .49	32 <sup>s</sup> .6 0 <sup>s</sup> .8
37	20 <sup>s</sup> .20 0 <sup>s</sup> .31	38 <sup>s</sup> .4 2 <sup>s</sup> .1	28 <sup>s</sup> .13 0 <sup>s</sup> .33	34 <sup>s</sup> .0 1 <sup>s</sup> .8	61 <sup>s</sup> .68 0 <sup>s</sup> .49	31 <sup>s</sup> .8 0 <sup>s</sup> .8



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ε Corvi.			β Chamæleontis.			η Virginis.		
	R. A.		Dec. South.	R. A.		Dec. South.	R. A.		Dec. North.
	<sup>h</sup> 12	<sup>m</sup> 3	<sup>°</sup> 21 <sup>'</sup> 53	<sup>h</sup> 12	<sup>m</sup> 10	<sup>°</sup> 78 <sup>'</sup> 35	<sup>h</sup> 12	<sup>m</sup> 13	<sup>°</sup> 0 <sup>'</sup> 3
Jan. 1	26 <sup>s</sup> .00 <sup>s</sup>		35 <sup>s</sup> .9 <sup>s</sup>	47 <sup>s</sup> .57 <sup>s</sup>		0 <sup>s</sup> .5 <sup>s</sup>	14 <sup>s</sup> .53 <sup>s</sup>		26 <sup>s</sup> .0 <sup>s</sup>
11	26 <sup>s</sup> .33 <sup>s</sup>	0 <sup>s</sup> .33	38 <sup>s</sup> .2 <sup>s</sup> 2 <sup>s</sup> .3	48 <sup>s</sup> .71 <sup>s</sup>	1 <sup>s</sup> .14	2 <sup>s</sup> .4 <sup>s</sup> 1 <sup>s</sup> .9	14 <sup>s</sup> .86 <sup>s</sup>	0 <sup>s</sup> .33	24 <sup>s</sup> .0 <sup>s</sup> 2 <sup>s</sup> .0
21	26 <sup>s</sup> .63 <sup>s</sup>	0 <sup>s</sup> .30	40 <sup>s</sup> .6 <sup>s</sup> 2 <sup>s</sup> .4	49 <sup>s</sup> .76 <sup>s</sup>	1 <sup>s</sup> .05	4 <sup>s</sup> .7 <sup>s</sup> 2 <sup>s</sup> .3	15 <sup>s</sup> .15 <sup>s</sup>	0 <sup>s</sup> .29	22 <sup>s</sup> .1 <sup>s</sup> 1 <sup>s</sup> .9
31	26 <sup>s</sup> .90 <sup>s</sup>	0 <sup>s</sup> .27	43 <sup>s</sup> .0 <sup>s</sup> 2 <sup>s</sup> .4	50 <sup>s</sup> .69 <sup>s</sup>	0 <sup>s</sup> .93	7 <sup>s</sup> .5 <sup>s</sup> 2 <sup>s</sup> .8	15 <sup>s</sup> .42 <sup>s</sup>	0 <sup>s</sup> .27	20 <sup>s</sup> .4 <sup>s</sup> 1 <sup>s</sup> .7
		0 <sup>s</sup> .24			0 <sup>s</sup> .79			0 <sup>s</sup> .24	
Feb. 10	27 <sup>s</sup> .14 <sup>s</sup>		45 <sup>s</sup> .4 <sup>s</sup>	51 <sup>s</sup> .48 <sup>s</sup>		10 <sup>s</sup> .7 <sup>s</sup>	15 <sup>s</sup> .66 <sup>s</sup>		18 <sup>s</sup> .9 <sup>s</sup> 1 <sup>s</sup> .5
20	27 <sup>s</sup> .33 <sup>s</sup>	0 <sup>s</sup> .19	47 <sup>s</sup> .7 <sup>s</sup> 2 <sup>s</sup> .3	52 <sup>s</sup> .12 <sup>s</sup>	0 <sup>s</sup> .64	14 <sup>s</sup> .2 <sup>s</sup> 3 <sup>s</sup> .5	15 <sup>s</sup> .86 <sup>s</sup>	0 <sup>s</sup> .20	17 <sup>s</sup> .6 <sup>s</sup> 1 <sup>s</sup> .3
Mar. 2	27 <sup>s</sup> .48 <sup>s</sup>	0 <sup>s</sup> .15	49 <sup>s</sup> .8 <sup>s</sup> 2 <sup>s</sup> .1	52 <sup>s</sup> .59 <sup>s</sup>	0 <sup>s</sup> .47	17 <sup>s</sup> .9 <sup>s</sup> 3 <sup>s</sup> .7	16 <sup>s</sup> .02 <sup>s</sup>	0 <sup>s</sup> .16	16 <sup>s</sup> .7 <sup>s</sup> 0 <sup>s</sup> .9
12	27 <sup>s</sup> .58 <sup>s</sup>	0 <sup>s</sup> .10	51 <sup>s</sup> .8 <sup>s</sup> 2 <sup>s</sup> .0	52 <sup>s</sup> .90 <sup>s</sup>	0 <sup>s</sup> .31	21 <sup>s</sup> .7 <sup>s</sup> 3 <sup>s</sup> .8	16 <sup>s</sup> .13 <sup>s</sup>	0 <sup>s</sup> .11	16 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .7
		0 <sup>s</sup> .07			0 <sup>s</sup> .13			0 <sup>s</sup> .08	
22	27 <sup>s</sup> .65 <sup>s</sup>		53 <sup>s</sup> .5 <sup>s</sup>	53 <sup>s</sup> .03 <sup>s</sup>		25 <sup>s</sup> .5 <sup>s</sup>	16 <sup>s</sup> .21 <sup>s</sup>		15 <sup>s</sup> .6 <sup>s</sup> 0 <sup>s</sup> .4
Apr. 1	27 <sup>s</sup> .68 <sup>s</sup>	0 <sup>s</sup> .03	55 <sup>s</sup> .0 <sup>s</sup> 1 <sup>s</sup> .5	53 <sup>s</sup> .00 <sup>s</sup>	0 <sup>s</sup> .03	29 <sup>s</sup> .2 <sup>s</sup> 3 <sup>s</sup> .7	16 <sup>s</sup> .25 <sup>s</sup>	0 <sup>s</sup> .04	15 <sup>s</sup> .4 <sup>s</sup> 0 <sup>s</sup> .2
11	27 <sup>s</sup> .68 <sup>s</sup>	0 <sup>s</sup> .00	56 <sup>s</sup> .2 <sup>s</sup> 1 <sup>s</sup> .2	52 <sup>s</sup> .81 <sup>s</sup>	0 <sup>s</sup> .19	32 <sup>s</sup> .8 <sup>s</sup> 3 <sup>s</sup> .6	16 <sup>s</sup> .26 <sup>s</sup>	0 <sup>s</sup> .01	15 <sup>s</sup> .4 <sup>s</sup> 0 <sup>s</sup> .0
21	27 <sup>s</sup> .65 <sup>s</sup>	0 <sup>s</sup> .03	57 <sup>s</sup> .2 <sup>s</sup> 1 <sup>s</sup> .0	52 <sup>s</sup> .47 <sup>s</sup>	0 <sup>s</sup> .34	36 <sup>s</sup> .2 <sup>s</sup> 3 <sup>s</sup> .4	16 <sup>s</sup> .24 <sup>s</sup>	0 <sup>s</sup> .02	15 <sup>s</sup> .6 <sup>s</sup> 0 <sup>s</sup> .2
		0 <sup>s</sup> .06			0 <sup>s</sup> .48			0 <sup>s</sup> .04	
May 1	27 <sup>s</sup> .59 <sup>s</sup>	0 <sup>s</sup> .08	58 <sup>s</sup> .0 <sup>s</sup>	51 <sup>s</sup> .99 <sup>s</sup>	0 <sup>s</sup> .60	39 <sup>s</sup> .3 <sup>s</sup> 2 <sup>s</sup> .8	16 <sup>s</sup> .20 <sup>s</sup>	0 <sup>s</sup> .06	16 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .4
11	27 <sup>s</sup> .51 <sup>s</sup>	0 <sup>s</sup> .09	58 <sup>s</sup> .5 <sup>s</sup> 0 <sup>s</sup> .5	51 <sup>s</sup> .39 <sup>s</sup>	0 <sup>s</sup> .71	42 <sup>s</sup> .1 <sup>s</sup> 2 <sup>s</sup> .4	16 <sup>s</sup> .14 <sup>s</sup>	0 <sup>s</sup> .08	16 <sup>s</sup> .4 <sup>s</sup> 0 <sup>s</sup> .4
21	27 <sup>s</sup> .42 <sup>s</sup>	0 <sup>s</sup> .11	58 <sup>s</sup> .8 <sup>s</sup> 0 <sup>s</sup> .3	50 <sup>s</sup> .68 <sup>s</sup>	0 <sup>s</sup> .81	44 <sup>s</sup> .5 <sup>s</sup> 1 <sup>s</sup> .9	16 <sup>s</sup> .06 <sup>s</sup>	0 <sup>s</sup> .08	17 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .6
31	27 <sup>s</sup> .31 <sup>s</sup>		58 <sup>s</sup> .8 <sup>s</sup> 0 <sup>s</sup> .0	49 <sup>s</sup> .87 <sup>s</sup>		46 <sup>s</sup> .4 <sup>s</sup>	15 <sup>s</sup> .98 <sup>s</sup>		17 <sup>s</sup> .6 <sup>s</sup> 0 <sup>s</sup> .6
		0 <sup>s</sup> .11			0 <sup>s</sup> .89			0 <sup>s</sup> .10	
June 10	27 <sup>s</sup> .20 <sup>s</sup>		58 <sup>s</sup> .6 <sup>s</sup>	48 <sup>s</sup> .98 <sup>s</sup>		47 <sup>s</sup> .8 <sup>s</sup>	15 <sup>s</sup> .88 <sup>s</sup>		18 <sup>s</sup> .2 <sup>s</sup> 0 <sup>s</sup> .6
20	27 <sup>s</sup> .08 <sup>s</sup>	0 <sup>s</sup> .12	58 <sup>s</sup> .2 <sup>s</sup> 0 <sup>s</sup> .4	48 <sup>s</sup> .04 <sup>s</sup>	0 <sup>s</sup> .94	48 <sup>s</sup> .7 <sup>s</sup> 0 <sup>s</sup> .9	15 <sup>s</sup> .78 <sup>s</sup>	0 <sup>s</sup> .10	18 <sup>s</sup> .9 <sup>s</sup> 0 <sup>s</sup> .7
30	26 <sup>s</sup> .96 <sup>s</sup>	0 <sup>s</sup> .12	57 <sup>s</sup> .6 <sup>s</sup> 0 <sup>s</sup> .6	47 <sup>s</sup> .08 <sup>s</sup>	0 <sup>s</sup> .96	49 <sup>s</sup> .1 <sup>s</sup> 0 <sup>s</sup> .4	15 <sup>s</sup> .68 <sup>s</sup>	0 <sup>s</sup> .10	19 <sup>s</sup> .5 <sup>s</sup> 0 <sup>s</sup> .6
July 10	26 <sup>s</sup> .84 <sup>s</sup>	0 <sup>s</sup> .12	56 <sup>s</sup> .8 <sup>s</sup> 0 <sup>s</sup> .8	46 <sup>s</sup> .11 <sup>s</sup>	0 <sup>s</sup> .97	48 <sup>s</sup> .9 <sup>s</sup> 0 <sup>s</sup> .2	15 <sup>s</sup> .58 <sup>s</sup>	0 <sup>s</sup> .10	20 <sup>s</sup> .1 <sup>s</sup> 0 <sup>s</sup> .6
		0 <sup>s</sup> .11			0 <sup>s</sup> .95			0 <sup>s</sup> .10	
20	26 <sup>s</sup> .73 <sup>s</sup>	0 <sup>s</sup> .11	55 <sup>s</sup> .8 <sup>s</sup>	45 <sup>s</sup> .16 <sup>s</sup>	0 <sup>s</sup> .90	48 <sup>s</sup> .1 <sup>s</sup>	15 <sup>s</sup> .48 <sup>s</sup>	0 <sup>s</sup> .09	20 <sup>s</sup> .7 <sup>s</sup> 0 <sup>s</sup> .5
30	26 <sup>s</sup> .62 <sup>s</sup>	0 <sup>s</sup> .09	54 <sup>s</sup> .7 <sup>s</sup> 1 <sup>s</sup> .1	44 <sup>s</sup> .26 <sup>s</sup>	0 <sup>s</sup> .81	46 <sup>s</sup> .8 <sup>s</sup> 1 <sup>s</sup> .3	15 <sup>s</sup> .39 <sup>s</sup>	0 <sup>s</sup> .08	21 <sup>s</sup> .2 <sup>s</sup> 0 <sup>s</sup> .5
Aug. 9	26 <sup>s</sup> .53 <sup>s</sup>	0 <sup>s</sup> .07	53 <sup>s</sup> .5 <sup>s</sup> 1 <sup>s</sup> .2	43 <sup>s</sup> .45 <sup>s</sup>	0 <sup>s</sup> .70	45 <sup>s</sup> .1 <sup>s</sup> 1 <sup>s</sup> .7	15 <sup>s</sup> .31 <sup>s</sup>	0 <sup>s</sup> .06	21 <sup>s</sup> .7 <sup>s</sup> 0 <sup>s</sup> .3
19	26 <sup>s</sup> .46 <sup>s</sup>		52 <sup>s</sup> .2 <sup>s</sup> 1 <sup>s</sup> .3	42 <sup>s</sup> .75 <sup>s</sup>		42 <sup>s</sup> .9 <sup>s</sup> 2 <sup>s</sup> .2	15 <sup>s</sup> .25 <sup>s</sup>		22 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .3
		0 <sup>s</sup> .05			0 <sup>s</sup> .57			0 <sup>s</sup> .05	
29	26 <sup>s</sup> .41 <sup>s</sup>	0 <sup>s</sup> .02	50 <sup>s</sup> .9 <sup>s</sup> 1 <sup>s</sup> .3	42 <sup>s</sup> .18 <sup>s</sup>	0 <sup>s</sup> .40	40 <sup>s</sup> .3 <sup>s</sup> 2 <sup>s</sup> .8	15 <sup>s</sup> .20 <sup>s</sup>	0 <sup>s</sup> .02	22 <sup>s</sup> .2 <sup>s</sup> 0 <sup>s</sup> .0
Sept. 8	26 <sup>s</sup> .39 <sup>s</sup>	0 <sup>s</sup> .01	49 <sup>s</sup> .7 <sup>s</sup> 1 <sup>s</sup> .2	41 <sup>s</sup> .78 <sup>s</sup>	0 <sup>s</sup> .22	37 <sup>s</sup> .5 <sup>s</sup> 3 <sup>s</sup> .0	15 <sup>s</sup> .18 <sup>s</sup>	0 <sup>s</sup> .01	22 <sup>s</sup> .2 <sup>s</sup> 0 <sup>s</sup> .1
18	26 <sup>s</sup> .40 <sup>s</sup>	0 <sup>s</sup> .05	48 <sup>s</sup> .6 <sup>s</sup> 1 <sup>s</sup> .0	41 <sup>s</sup> .56 <sup>s</sup>	0 <sup>s</sup> .00	34 <sup>s</sup> .5 <sup>s</sup> 3 <sup>s</sup> .3	15 <sup>s</sup> .19 <sup>s</sup>	0 <sup>s</sup> .05	22 <sup>s</sup> .1 <sup>s</sup> 0 <sup>s</sup> .4
28	26 <sup>s</sup> .45 <sup>s</sup>		47 <sup>s</sup> .6 <sup>s</sup>	41 <sup>s</sup> .56 <sup>s</sup>		31 <sup>s</sup> .2 <sup>s</sup> 3 <sup>s</sup> .0	15 <sup>s</sup> .24 <sup>s</sup>		21 <sup>s</sup> .7 <sup>s</sup> 0 <sup>s</sup> .7
		0 <sup>s</sup> .10			0 <sup>s</sup> .21			0 <sup>s</sup> .08	
Oct. 8	26 <sup>s</sup> .55 <sup>s</sup>	0 <sup>s</sup> .14	46 <sup>s</sup> .9 <sup>s</sup> 0 <sup>s</sup> .7	41 <sup>s</sup> .77 <sup>s</sup>	0 <sup>s</sup> .41	28 <sup>s</sup> .2 <sup>s</sup> 2 <sup>s</sup> .8	15 <sup>s</sup> .32 <sup>s</sup>	0 <sup>s</sup> .13	21 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .9
18	26 <sup>s</sup> .69 <sup>s</sup>	0 <sup>s</sup> .19	46 <sup>s</sup> .5 <sup>s</sup> 0 <sup>s</sup> .4	42 <sup>s</sup> .18 <sup>s</sup>	0 <sup>s</sup> .62	25 <sup>s</sup> .4 <sup>s</sup> 2 <sup>s</sup> .4	15 <sup>s</sup> .45 <sup>s</sup>	0 <sup>s</sup> .17	20 <sup>s</sup> .1 <sup>s</sup> 1 <sup>s</sup> .2
28	26 <sup>s</sup> .88 <sup>s</sup>	0 <sup>s</sup> .23	46 <sup>s</sup> .5 <sup>s</sup> 0 <sup>s</sup> .3	42 <sup>s</sup> .80 <sup>s</sup>	0 <sup>s</sup> .80	23 <sup>s</sup> .0 <sup>s</sup> 2 <sup>s</sup> .1	15 <sup>s</sup> .62 <sup>s</sup>	0 <sup>s</sup> .21	18 <sup>s</sup> .9 <sup>s</sup> 1 <sup>s</sup> .4
Nov. 7	27 <sup>s</sup> .11 <sup>s</sup>		46 <sup>s</sup> .8 <sup>s</sup>	43 <sup>s</sup> .60 <sup>s</sup>		20 <sup>s</sup> .9 <sup>s</sup> 1 <sup>s</sup> .6	15 <sup>s</sup> .83 <sup>s</sup>		17 <sup>s</sup> .5 <sup>s</sup> 1 <sup>s</sup> .7
		0 <sup>s</sup> .27			0 <sup>s</sup> .95			0 <sup>s</sup> .24	
17	27 <sup>s</sup> .38 <sup>s</sup>	0 <sup>s</sup> .31	47 <sup>s</sup> .6 <sup>s</sup> 1 <sup>s</sup> .1	44 <sup>s</sup> .55 <sup>s</sup>	1 <sup>s</sup> .07	19 <sup>s</sup> .3 <sup>s</sup> 0 <sup>s</sup> .9	16 <sup>s</sup> .07 <sup>s</sup>	0 <sup>s</sup> .28	15 <sup>s</sup> .8 <sup>s</sup> 1 <sup>s</sup> .8
27	27 <sup>s</sup> .69 <sup>s</sup>	0 <sup>s</sup> .33	48 <sup>s</sup> .7 <sup>s</sup> 1 <sup>s</sup> .5	45 <sup>s</sup> .62 <sup>s</sup>	1 <sup>s</sup> .16	18 <sup>s</sup> .4 <sup>s</sup> 0 <sup>s</sup> .4	16 <sup>s</sup> .35 <sup>s</sup>	0 <sup>s</sup> .31	14 <sup>s</sup> .0 <sup>s</sup> 2 <sup>s</sup> .0
Dec. 7	28 <sup>s</sup> .02 <sup>s</sup>	0 <sup>s</sup> .34	50 <sup>s</sup> .2 <sup>s</sup> 1 <sup>s</sup> .8	46 <sup>s</sup> .78 <sup>s</sup>	1 <sup>s</sup> .20	18 <sup>s</sup> .0 <sup>s</sup> 0 <sup>s</sup> .3	16 <sup>s</sup> .66 <sup>s</sup>	0 <sup>s</sup> .33	12 <sup>s</sup> .0 <sup>s</sup> 2 <sup>s</sup> .2
17	28 <sup>s</sup> .36 <sup>s</sup>		52 <sup>s</sup> .0 <sup>s</sup>	47 <sup>s</sup> .98 <sup>s</sup>			16 <sup>s</sup> .99 <sup>s</sup>		9 <sup>s</sup> .8 <sup>s</sup> 2 <sup>s</sup> .1
		0 <sup>s</sup> .34			1 <sup>s</sup> .21			0 <sup>s</sup> .33	
27	28 <sup>s</sup> .70 <sup>s</sup>	0 <sup>s</sup> .34	54 <sup>s</sup> .0 <sup>s</sup>	49 <sup>s</sup> .19 <sup>s</sup>	1 <sup>s</sup> .19	19 <sup>s</sup> .2 <sup>s</sup> 1 <sup>s</sup> .6	17 <sup>s</sup> .32 <sup>s</sup>	0 <sup>s</sup> .32	7 <sup>s</sup> .7 <sup>s</sup> 2 <sup>s</sup> .2
37	29 <sup>s</sup> .04 <sup>s</sup>		56 <sup>s</sup> .3 <sup>s</sup>	50 <sup>s</sup> .38 <sup>s</sup>		20 <sup>s</sup> .8 <sup>s</sup>	17 <sup>s</sup> .64 <sup>s</sup>		5 <sup>s</sup> .5 <sup>s</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Crucis.			$\beta$ Corvi.			$\gamma$ Virginia.		
	R.A.		Dec. South.	R.A.		Dec. South.	R.A.		Dec. South.
	h	m	° ' "	h	m	° ' "	h	m	° ' "
	12	19	62 22	12	27	22 40	12	35	0 44
Jan. 1	22 <sup>h</sup> .69 <sup>m</sup>	0 <sup>s</sup> .55	14 <sup>°</sup> .8 <sup>'</sup>	32 <sup>h</sup> .84 <sup>m</sup>	0 <sup>s</sup> .34	27 <sup>°</sup> .1 <sup>'</sup>	3 <sup>h</sup> .58 <sup>m</sup>	0 <sup>s</sup> .32	6 <sup>°</sup> .8 <sup>'</sup>
11	23.24	0.52	16.8 2.0	33.18	0.32	29.3 2.2	3.90	0.31	8.8 2.0
21	23.76	0.56	19.3 2.5	33.50	0.29	31.6 2.3	4.21	0.28	10.7 1.9
31	24.22	0.46	22.2 2.9	33.79	0.25	34.0 2.4	4.49	0.25	12.5 1.8
Feb. 10	24.62	0.40	25.3 3.1	34.04	0.22	36.3 2.3	4.74	0.22	14.1 1.6
20	24.96	0.36	28.6 3.3	34.26	0.17	38.6 2.1	4.96	0.17	15.4 1.3
Mar. 2	25.22	0.18	32.1 3.5	34.43	0.14	40.7 2.0	5.13	0.14	16.4 1.0
12	25.40	0.11	35.6 3.5	34.57	0.09	42.7 1.8	5.27	0.10	17.1 0.7
22	25.51	0.04	39.1 3.4	34.66	0.06	44.5 1.5	5.37	0.06	17.6 0.5
Apr. 1	25.55	0.03	42.5 3.2	34.72	0.02	46.0 1.4	5.43	0.03	17.8 0.2
11	25.52	0.09	45.7 3.0	34.74	0.01	47.4 1.1	5.46	0.00	17.9 0.1
21	25.43	0.15	48.7 2.7	34.73	0.03	48.5 0.8	5.46	0.02	17.7 0.2
May 1	25.28	0.20	51.4 2.3	34.70	0.06	49.3 0.6	5.44	0.05	17.4 0.3
11	25.08	0.24	53.7 1.9	34.64	0.08	49.9 0.4	5.39	0.06	16.9 0.5
21	24.84	0.28	55.6 1.5	34.56	0.09	50.3 0.2	5.33	0.08	16.4 0.5
31	24.56	0.31	57.1 1.1	34.47	0.10	50.5 0.1	5.25	0.08	15.8 0.6
June 10	24.25	0.33	58.2 0.6	34.37	0.11	50.4 0.3	5.17	0.10	15.2 0.6
20	23.92	0.35	58.8 0.1	34.26	0.12	50.1 0.4	5.07	0.10	14.5 0.7
30	23.57	0.35	58.9 0.4	34.14	0.13	49.7 0.7	4.97	0.11	14.5 0.6
July 10	23.22	0.35	58.5 0.9	34.01	0.12	49.0 0.9	4.86	0.10	13.9 0.6
20	22.87	0.33	57.6 1.3	33.89	0.11	48.1 1.0	4.76	0.10	13.3 0.6
30	22.54	0.31	56.3 1.7	33.78	0.11	47.1 1.1	4.66	0.10	12.7 0.6
Aug. 9	22.23	0.26	54.6 2.1	33.67	0.10	46.0 1.2	4.56	0.08	12.1 0.6
19	21.97	0.21	52.5 2.4	33.57	0.07	44.8 1.2	4.48	0.06	11.7 0.4
29	21.76	0.15	50.1 2.6	33.50	0.05	43.6 1.2	4.42	0.04	11.4 0.3
Sept. 8	21.61	0.08	47.5 2.7	33.45	0.01	42.4 1.1	4.38	0.01	11.2 0.2
18	21.53	0.01	44.8 2.7	33.44	0.03	41.3 1.0	4.37	0.02	11.1 0.1
28	{21.44}	{0.01}	{41.8}	33.47	0.07	40.3 0.8	4.39	0.06	11.2 0.3
Oct. 8	21.65	0.10	39.2 2.6	33.54	0.12	39.5 0.5	4.45	0.10	11.5 0.7
18	21.85	0.20	36.8 2.4	33.66	0.17	39.0 0.1	4.55	0.15	12.2 0.8
28	22.13	0.37	34.8 1.6	33.83	0.21	38.9 0.3	4.70	0.19	13.0 1.1
Nov. 7	22.50	0.45	33.2 1.1	34.04	0.26	39.2 0.5	4.89	0.23	14.1 1.4
17	22.95	0.50	32.1 0.6	34.30	0.29	39.7 1.0	5.12	0.27	15.5 1.6
27	23.45	0.55	31.5 0.1	34.59	0.32	40.7 1.3	5.39	0.30	17.1 1.9
Dec. 7	24.00	0.58	31.6 0.6	34.91	0.34	42.0 1.7	5.69	0.31	19.0 2.0
17	24.58	0.58	32.2 1.2	35.25	0.35	43.7 1.9	6.00	0.33	21.0 2.1
27	25.16	0.57	33.4 1.8	35.60	0.34	45.6 2.2	6.33	0.33	23.1 2.1
37	25.73	0.57	35.2 1.8	35.94	0.34	47.8 2.2	6.66	0.33	25.2 2.2



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	12 Canum Venaticor.			θ Virginis.			α Virginis. (Spica)					
	R. A.	Dec. North.		R. A.	Dec. South.		R. A.	Dec. South.				
	<sup>h</sup> 12	<sup>m</sup> 49	<sup>o</sup> 39	<sup>'</sup> 0	<sup>h</sup> 13	<sup>m</sup> 3	<sup>h</sup> 13	<sup>m</sup> 18	<sup>o</sup> 10	<sup>'</sup> 28		
Jan. 1	55° 36'	0° 39'	68° 2'	1° 5'	12° 20'	0° 33'	32° 6'	1° 1'	19° 68'	0° 33'	46° 3'	2° 1'
11	55° 75'	0° 38'	66° 7'	1° 1'	12° 53'	0° 31'	34° 7'	2° 0'	20° 01'	0° 32'	48° 4'	2° 0'
21	56° 13'	0° 35'	65° 6'	0° 5'	12° 84'	0° 30'	36° 7'	1° 9'	20° 33'	0° 30'	50° 4'	2° 0'
31	56° 48'	0° 32'	65° 1'	0° 0'	13° 14'	0° 27'	38° 6'	1° 6'	20° 63'	0° 28'	52° 4'	1° 8'
Feb. 10	56° 80'	0° 28'	65° 1'	0° 5'	13° 41'	0° 24'	40° 2'	1° 5'	20° 91'	0° 25'	54° 2'	1° 7'
20	57° 08'	0° 23'	65° 6'	1° 0'	13° 65'	0° 20'	41° 7'	1° 2'	21° 16'	0° 22'	55° 9'	1° 4'
Mar. 2	57° 31'	0° 19'	66° 6'	1° 5'	13° 85'	0° 16'	42° 9'	1° 0'	21° 38'	0° 18'	57° 3'	1° 3'
12	57° 50'	0° 13'	68° 1'	1° 7'	14° 01'	0° 13'	43° 9'	0° 7'	21° 56'	0° 14'	58° 6'	1° 0'
Apr. 22	57° 63'	0° 08'	69° 8'	1° 9'	14° 14'	0° 09'	44° 6'	0° 5'	21° 70'	0° 11'	59° 6'	0° 8'
1	57° 71'	0° 04'	71° 7'	2° 1'	14° 23'	0° 06'	45° 1'	0° 3'	21° 81'	0° 07'	60° 4'	0° 6'
11	57° 75'	0° 01'	73° 8'	2° 2'	14° 29'	0° 03'	45° 4'	0° 0'	21° 88'	0° 05'	61° 0'	0° 4'
21	57° 74'	0° 04'	76° 0'	2° 2'	14° 32'	0° 00'	45° 4'	0° 1'	21° 93'	0° 02'	61° 4'	0° 2'
May 1	57° 70'	0° 08'	78° 2'	2° 0'	14° 32'	0° 02'	45° 3'	0° 3'	21° 95'	0° 01'	61° 6'	0° 0'
11	57° 62'	0° 10'	80° 2'	1° 9'	14° 30'	0° 04'	45° 0'	0° 3'	21° 94'	0° 03'	61° 6'	0° 1'
21	57° 52'	0° 13'	82° 1'	1° 6'	14° 26'	0° 05'	44° 7'	0° 5'	21° 91'	0° 04'	61° 5'	0° 2'
31	57° 39'	0° 14'	83° 7'	1° 3'	14° 21'	0° 08'	44° 2'	0° 5'	21° 87'	0° 07'	61° 3'	0° 3'
June 10	57° 25'	0° 16'	85° 0'	1° 0'	14° 13'	0° 09'	43° 7'	0° 5'	21° 80'	0° 08'	61° 0'	0° 4'
20	57° 09'	0° 16'	86° 0'	0° 7'	14° 04'	0° 09'	43° 2'	0° 6'	21° 72'	0° 10'	60° 6'	0° 5'
30	56° 93'	0° 16'	86° 7'	0° 2'	13° 95'	0° 11'	42° 6'	0° 6'	21° 62'	0° 11'	60° 1'	0° 6'
July 10	56° 77'	0° 16'	86° 9'	0° 1'	13° 84'	0° 11'	42° 0'	0° 6'	21° 51'	0° 11'	59° 5'	0° 6'
20	56° 61'	0° 16'	86° 8'	0° 5'	13° 73'	0° 11'	41° 4'	0° 6'	21° 40'	0° 12'	58° 9'	0° 6'
30	56° 45'	0° 15'	86° 3'	0° 9'	13° 62'	0° 11'	40° 8'	0° 6'	21° 28'	0° 12'	58° 3'	0° 6'
Aug. 9	56° 30'	0° 13'	85° 4'	1° 3'	13° 51'	0° 10'	40° 2'	0° 4'	21° 16'	0° 11'	57° 7'	0° 6'
19	56° 17'	0° 11'	84° 1'	1° 6'	13° 41'	0° 09'	39° 8'	0° 4'	21° 05'	0° 10'	57° 1'	0° 6'
29	56° 06'	0° 08'	82° 5'	1° 9'	13° 32'	0° 06'	39° 4'	0° 2'	20° 95'	0° 08'	56° 5'	0° 5'
Sept. 8	55° 98'	0° 04'	80° 6'	2° 3'	13° 26'	0° 04'	39° 2'	0° 1'	20° 87'	0° 05'	56° 0'	0° 4'
18	55° 94'	0° 01'	78° 3'	2° 5'	13° 22'	0° 01'	39° 1'	0° 1'	20° 82'	0° 02'	55° 6'	0° 2'
28	55° 93'	0° 04'	75° 8'	3° 0'	13° 21'	0° 04'	39° 2'	0° 3'	20° 80'	0° 01'	55° 4'	0° 0'
Oct. 8	55° 97'	0° 09'	72° 8'	3° 0'	13° 25'	0° 08'	39° 5'	0° 8'	20° 81'	0° 07'	55° 4'	0° 2'
18	56° 06'	0° 14'	69° 8'	3° 0'	13° 33'	0° 12'	40° 1'	0° 8'	20° 88'	0° 11'	55° 6'	0° 5'
28	56° 20'	0° 20'	66° 8'	3° 1'	13° 45'	0° 17'	40° 9'	1° 1'	20° 99'	0° 15'	56° 1'	0° 7'
Nov. 7	56° 40'	0° 24'	63° 7'	3° 2'	13° 62'	0° 21'	42° 0'	1° 4'	21° 14'	0° 20'	56° 8'	1° 0'
17	56° 64'	0° 30'	60° 5'	3° 1'	13° 83'	0° 25'	43° 4'	1° 6'	21° 34'	0° 25'	57° 8'	1° 4'
27	56° 94'	0° 34'	57° 4'	2° 8'	14° 08'	0° 28'	45° 0'	1° 9'	21° 59'	0° 28'	59° 2'	1° 6'
Dec. 7	57° 28'	0° 36'	54° 6'	2° 6'	14° 36'	0° 31'	46° 9'	2° 0'	21° 87'	0° 31'	60° 8'	1° 8'
17	57° 64'	0° 38'	52° 0'	2° 3'	14° 67'	0° 33'	48° 9'	2° 1'	22° 18'	0° 33'	62° 6'	1° 9'
27	58° 02'	0° 39'	49° 7'	1° 8'	15° 00'	0° 33'	51° 0'	2° 1'	22° 51'	0° 33'	64° 5'	2° 0'
37	58° 41'	0° 39'	47° 9'	1° 8'	15° 33'	0° 33'	53° 1'	2° 1'	22° 84'	0° 33'	66° 5'	2° 0'



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ζ Virginis.		η Ursæ Majoris.		η Bootis.	
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.
	<sup>h</sup> 13 <sup>m</sup> 28	<sup>°</sup> 0 3	<sup>h</sup> 13 <sup>m</sup> 42	<sup>°</sup> 49 57	<sup>h</sup> 13 <sup>m</sup> 48	<sup>°</sup> 19 2
Jan. 1	3 <sup>s</sup> 09 3 <sup>s</sup>	77 <sup>s</sup> 2 <sup>s</sup>	23 <sup>s</sup> 37 3 <sup>s</sup>	37 <sup>s</sup> 4 <sup>s</sup>	28 <sup>s</sup> 34 3 <sup>s</sup>	60 <sup>s</sup> 6 <sup>s</sup>
11	3 <sup>s</sup> 41 0 <sup>s</sup> 32	75 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 1	23 <sup>s</sup> 37 0 <sup>s</sup> 42	35 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 9	28 <sup>s</sup> 68 0 <sup>s</sup> 34	58 <sup>s</sup> 4 <sup>s</sup> 2 <sup>s</sup> 2
21	3 <sup>s</sup> 73 0 <sup>s</sup> 32	73 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 0	24 <sup>s</sup> 23 0 <sup>s</sup> 44	34 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 3	29 <sup>s</sup> 01 0 <sup>s</sup> 33	56 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 8
31	4 <sup>s</sup> 03 0 <sup>s</sup> 30	71 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 7	24 <sup>s</sup> 23 0 <sup>s</sup> 43	33 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 7	29 <sup>s</sup> 33 0 <sup>s</sup> 32	55 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 5
	0 <sup>s</sup> 28	1 <sup>s</sup> 6	0 <sup>s</sup> 41	0 <sup>s</sup> 1	0 <sup>s</sup> 30	1 <sup>s</sup> 1
Feb. 10	4 <sup>s</sup> 31 0 <sup>s</sup> 26	69 <sup>s</sup> 8 <sup>s</sup>	25 <sup>s</sup> 07 0 <sup>s</sup> 37	33 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 5	29 <sup>s</sup> 63 0 <sup>s</sup> 28	54 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 6
20	4 <sup>s</sup> 57 0 <sup>s</sup> 22	68 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 2	25 <sup>s</sup> 44 0 <sup>s</sup> 32	33 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 0	29 <sup>s</sup> 91 0 <sup>s</sup> 25	53 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 2
Mar. 2	4 <sup>s</sup> 79 0 <sup>s</sup> 18	67 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 0	25 <sup>s</sup> 76 0 <sup>s</sup> 28	34 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 6	30 <sup>s</sup> 16 0 <sup>s</sup> 21	53 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 2
12	4 <sup>s</sup> 97 0 <sup>s</sup> 15	66 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 4	26 <sup>s</sup> 04 0 <sup>s</sup> 22	36 <sup>s</sup> 5 <sup>s</sup> 2 <sup>s</sup> 0	30 <sup>s</sup> 37 0 <sup>s</sup> 17	53 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 6
	0 <sup>s</sup> 12	0 <sup>s</sup> 2	0 <sup>s</sup> 16	2 <sup>s</sup> 3	0 <sup>s</sup> 14	0 <sup>s</sup> 9
Apr. 1	5 <sup>s</sup> 24 0 <sup>s</sup> 08	66 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 1	26 <sup>s</sup> 42 0 <sup>s</sup> 11	40 <sup>s</sup> 8 <sup>s</sup> 2 <sup>s</sup> 5	30 <sup>s</sup> 68 0 <sup>s</sup> 10	54 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 1
11	5 <sup>s</sup> 32 0 <sup>s</sup> 06	66 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 3	26 <sup>s</sup> 53 0 <sup>s</sup> 05	43 <sup>s</sup> 3 <sup>s</sup> 2 <sup>s</sup> 7	30 <sup>s</sup> 78 0 <sup>s</sup> 07	56 <sup>s</sup> 0 <sup>s</sup> 1 <sup>s</sup> 3
21	5 <sup>s</sup> 38 0 <sup>s</sup> 02	66 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 4	26 <sup>s</sup> 58 0 <sup>s</sup> 01	46 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 7	30 <sup>s</sup> 85 0 <sup>s</sup> 04	57 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 5
May 1	5 <sup>s</sup> 40 0 <sup>s</sup> 00	67 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 5	26 <sup>s</sup> 57 0 <sup>s</sup> 05	48 <sup>s</sup> 7 <sup>s</sup> 2 <sup>s</sup> 6	30 <sup>s</sup> 89 0 <sup>s</sup> 01	58 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 6
11	5 <sup>s</sup> 40 0 <sup>s</sup> 02	67 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 6	26 <sup>s</sup> 52 0 <sup>s</sup> 09	51 <sup>s</sup> 3 <sup>s</sup> 2 <sup>s</sup> 4	30 <sup>s</sup> 90 0 <sup>s</sup> 02	60 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 5
21	5 <sup>s</sup> 38 0 <sup>s</sup> 05	68 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 7	26 <sup>s</sup> 43 0 <sup>s</sup> 13	53 <sup>s</sup> 7 <sup>s</sup> 2 <sup>s</sup> 2	30 <sup>s</sup> 88 0 <sup>s</sup> 05	61 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 5
31	5 <sup>s</sup> 33 0 <sup>s</sup> 06	68 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 7	26 <sup>s</sup> 30 0 <sup>s</sup> 17	55 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 8	30 <sup>s</sup> 83 0 <sup>s</sup> 06	63 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 3
June 10	5 <sup>s</sup> 27 0 <sup>s</sup> 08	69 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 7	26 <sup>s</sup> 13 0 <sup>s</sup> 19	57 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 5	30 <sup>s</sup> 77 0 <sup>s</sup> 09	64 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 2
20	5 <sup>s</sup> 19 0 <sup>s</sup> 09	70 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 6	25 <sup>s</sup> 94 0 <sup>s</sup> 21	59 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 0	30 <sup>s</sup> 68 0 <sup>s</sup> 10	65 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 0
30	5 <sup>s</sup> 10 0 <sup>s</sup> 10	70 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 7	25 <sup>s</sup> 73 0 <sup>s</sup> 22	60 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 6	30 <sup>s</sup> 58 0 <sup>s</sup> 11	66 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 7
July 10	5 <sup>s</sup> 00 0 <sup>s</sup> 11	71 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 5	25 <sup>s</sup> 51 0 <sup>s</sup> 24	60 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 2	30 <sup>s</sup> 47 0 <sup>s</sup> 13	67 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 6
20	4 <sup>s</sup> 89 0 <sup>s</sup> 12	72 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 5	25 <sup>s</sup> 27 0 <sup>s</sup> 24	61 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 3	30 <sup>s</sup> 34 0 <sup>s</sup> 13	68 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 3
30	4 <sup>s</sup> 77 0 <sup>s</sup> 12	72 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 4	25 <sup>s</sup> 03 0 <sup>s</sup> 23	60 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 8	30 <sup>s</sup> 21 0 <sup>s</sup> 14	68 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 0
Aug. 9	4 <sup>s</sup> 65 0 <sup>s</sup> 11	73 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 3	24 <sup>s</sup> 80 0 <sup>s</sup> 23	59 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 2	30 <sup>s</sup> 07 0 <sup>s</sup> 13	68 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 3
19	4 <sup>s</sup> 54 0 <sup>s</sup> 10	73 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 2	24 <sup>s</sup> 57 0 <sup>s</sup> 21	58 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 6	29 <sup>s</sup> 94 0 <sup>s</sup> 13	68 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 5
29	4 <sup>s</sup> 44 0 <sup>s</sup> 09	73 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 0	24 <sup>s</sup> 36 0 <sup>s</sup> 18	57 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 1	29 <sup>s</sup> 81 0 <sup>s</sup> 11	67 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 9
Sept. 8	4 <sup>s</sup> 35 0 <sup>s</sup> 06	73 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 2	24 <sup>s</sup> 18 0 <sup>s</sup> 14	55 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 4	29 <sup>s</sup> 70 0 <sup>s</sup> 08	66 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 1
18	4 <sup>s</sup> 29 0 <sup>s</sup> 03	73 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 4	24 <sup>s</sup> 04 0 <sup>s</sup> 10	52 <sup>s</sup> 6 <sup>s</sup> 2 <sup>s</sup> 8	29 <sup>s</sup> 62 0 <sup>s</sup> 06	65 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 4
28	4 <sup>s</sup> 26 0 <sup>s</sup> 00	72 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 5	23 <sup>s</sup> 94 0 <sup>s</sup> 06	49 <sup>s</sup> 8 <sup>s</sup> 3 <sup>s</sup> 1	29 <sup>s</sup> 56 0 <sup>s</sup> 02	64 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 6
Oct. 8	4 <sup>s</sup> 26 0 <sup>s</sup> 06	72 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 0	23 <sup>s</sup> 88 0 <sup>s</sup> 00	46 <sup>s</sup> 7 <sup>s</sup> 3 <sup>s</sup> 3	29 <sup>s</sup> 54 0 <sup>s</sup> 02	62 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 9
18	4 <sup>s</sup> 32 0 <sup>s</sup> 09	71 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 1	23 <sup>s</sup> 88 0 <sup>s</sup> 06	43 <sup>s</sup> 4 <sup>s</sup> 3 <sup>s</sup> 8	29 <sup>s</sup> 56 0 <sup>s</sup> 07	60 <sup>s</sup> 8 <sup>s</sup> 2 <sup>s</sup> 4
28	4 <sup>s</sup> 41 0 <sup>s</sup> 15	70 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 4	23 <sup>s</sup> 94 0 <sup>s</sup> 13	39 <sup>s</sup> 6 <sup>s</sup> 3 <sup>s</sup> 6	29 <sup>s</sup> 63 0 <sup>s</sup> 12	58 <sup>s</sup> 4 <sup>s</sup> 2 <sup>s</sup> 4
Nov. 7	4 <sup>s</sup> 56 0 <sup>s</sup> 19	68 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 6	24 <sup>s</sup> 07 0 <sup>s</sup> 20	36 <sup>s</sup> 0 <sup>s</sup> 3 <sup>s</sup> 6	29 <sup>s</sup> 75 0 <sup>s</sup> 17	56 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 6
17	4 <sup>s</sup> 75 0 <sup>s</sup> 22	67 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 8	24 <sup>s</sup> 27 0 <sup>s</sup> 26	32 <sup>s</sup> 4 <sup>s</sup> 3 <sup>s</sup> 5	29 <sup>s</sup> 92 0 <sup>s</sup> 21	53 <sup>s</sup> 4 <sup>s</sup> 2 <sup>s</sup> 6
27	4 <sup>s</sup> 97 0 <sup>s</sup> 27	65 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 9	24 <sup>s</sup> 53 0 <sup>s</sup> 32	28 <sup>s</sup> 9 <sup>s</sup> 3 <sup>s</sup> 3	30 <sup>s</sup> 13 0 <sup>s</sup> 25	50 <sup>s</sup> 8 <sup>s</sup> 2 <sup>s</sup> 7
Dec. 7	5 <sup>s</sup> 24 0 <sup>s</sup> 30	63 <sup>s</sup> 6 <sup>s</sup> 2 <sup>s</sup> 1	24 <sup>s</sup> 85 0 <sup>s</sup> 37	25 <sup>s</sup> 6 <sup>s</sup> 3 <sup>s</sup> 0	30 <sup>s</sup> 38 0 <sup>s</sup> 29	48 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 7
17	5 <sup>s</sup> 54 0 <sup>s</sup> 31	61 <sup>s</sup> 5 <sup>s</sup> 2 <sup>s</sup> 2	25 <sup>s</sup> 22 0 <sup>s</sup> 40	22 <sup>s</sup> 6 <sup>s</sup> 2 <sup>s</sup> 7	30 <sup>s</sup> 67 0 <sup>s</sup> 31	45 <sup>s</sup> 4 <sup>s</sup> 2 <sup>s</sup> 5
27	5 <sup>s</sup> 85 0 <sup>s</sup> 33	59 <sup>s</sup> 3 <sup>s</sup> 2 <sup>s</sup> 1	25 <sup>s</sup> 62 0 <sup>s</sup> 43	19 <sup>s</sup> 9 <sup>s</sup> 2 <sup>s</sup> 4	30 <sup>s</sup> 98 0 <sup>s</sup> 33	42 <sup>s</sup> 9 <sup>s</sup> 2 <sup>s</sup> 3
37	6 <sup>s</sup> 18 0 <sup>s</sup> 33	57 <sup>s</sup> 2 <sup>s</sup> 2 <sup>s</sup> 1	26 <sup>s</sup> 05 0 <sup>s</sup> 43	17 <sup>s</sup> 5 <sup>s</sup> 2 <sup>s</sup> 4	31 <sup>s</sup> 31 0 <sup>s</sup> 33	40 <sup>s</sup> 6 <sup>s</sup> 2 <sup>s</sup> 3



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Centauri.		$\tau$ Virginis.		$\alpha$ Bootis. (Arcturus)	
	R.A.	Dec. South.	R.A.	Dec. North.	R.A.	Dec. North.
	<sup>h</sup> <sup>m</sup> 13 54	<sup>°</sup> <sup>'</sup> 59 44	<sup>h</sup> <sup>m</sup> 13 55	<sup>°</sup> <sup>'</sup> 2 10	<sup>h</sup> <sup>m</sup> 14 9	<sup>°</sup> <sup>'</sup> 19 51
Jan. 1	38 <sup>s</sup> .73 <sup>s</sup>	16 <sup>s</sup> .2 <sup>s</sup>	0 <sup>s</sup> .54 <sup>s</sup>	33 <sup>s</sup> .5 <sup>s</sup>	42 <sup>s</sup> .46 <sup>s</sup>	37 <sup>s</sup> .0 <sup>s</sup>
11	39 <sup>s</sup> .29 <sup>s</sup>	17 <sup>s</sup> .1 <sup>s</sup>	0 <sup>s</sup> .86 <sup>s</sup>	31 <sup>s</sup> .4 <sup>s</sup>	42 <sup>s</sup> .78 <sup>s</sup>	34 <sup>s</sup> .7 <sup>s</sup>
21	39 <sup>s</sup> .84 <sup>s</sup>	18 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .18 <sup>s</sup>	29 <sup>s</sup> .5 <sup>s</sup>	43 <sup>s</sup> .11 <sup>s</sup>	32 <sup>s</sup> .7 <sup>s</sup>
31	40 <sup>s</sup> .38 <sup>s</sup>	20 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .49 <sup>s</sup>	27 <sup>s</sup> .8 <sup>s</sup>	43 <sup>s</sup> .43 <sup>s</sup>	31 <sup>s</sup> .1 <sup>s</sup>
	<sup>s</sup> 50	<sup>s</sup> 21	<sup>s</sup> 30	<sup>s</sup> 15	<sup>s</sup> 31	<sup>s</sup> 12
Feb. 10	40 <sup>s</sup> .88 <sup>s</sup>	22 <sup>s</sup> .3 <sup>s</sup>	1 <sup>s</sup> .79 <sup>s</sup>	26 <sup>s</sup> .3 <sup>s</sup>	43 <sup>s</sup> .74 <sup>s</sup>	29 <sup>s</sup> .9 <sup>s</sup>
20	41 <sup>s</sup> .34 <sup>s</sup>	24 <sup>s</sup> .8 <sup>s</sup>	2 <sup>s</sup> .06 <sup>s</sup>	25 <sup>s</sup> .1 <sup>s</sup>	44 <sup>s</sup> .03 <sup>s</sup>	29 <sup>s</sup> .2 <sup>s</sup>
Mar. 2	41 <sup>s</sup> .76 <sup>s</sup>	27 <sup>s</sup> .5 <sup>s</sup>	2 <sup>s</sup> .30 <sup>s</sup>	24 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .29 <sup>s</sup>	28 <sup>s</sup> .9 <sup>s</sup>
12	42 <sup>s</sup> .12 <sup>s</sup>	30 <sup>s</sup> .4 <sup>s</sup>	2 <sup>s</sup> .50 <sup>s</sup>	23 <sup>s</sup> .6 <sup>s</sup>	44 <sup>s</sup> .51 <sup>s</sup>	29 <sup>s</sup> .0 <sup>s</sup>
	<sup>s</sup> 31	<sup>s</sup> 30	<sup>s</sup> 18	<sup>s</sup> 04	<sup>s</sup> 19	<sup>s</sup> 05
Apr. 22	42 <sup>s</sup> .43 <sup>s</sup>	33 <sup>s</sup> .4 <sup>s</sup>	2 <sup>s</sup> .68 <sup>s</sup>	23 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .70 <sup>s</sup>	29 <sup>s</sup> .5 <sup>s</sup>
1	42 <sup>s</sup> .67 <sup>s</sup>	36 <sup>s</sup> .4 <sup>s</sup>	2 <sup>s</sup> .82 <sup>s</sup>	23 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .86 <sup>s</sup>	30 <sup>s</sup> .3 <sup>s</sup>
11	42 <sup>s</sup> .86 <sup>s</sup>	39 <sup>s</sup> .4 <sup>s</sup>	2 <sup>s</sup> .93 <sup>s</sup>	23 <sup>s</sup> .4 <sup>s</sup>	44 <sup>s</sup> .98 <sup>s</sup>	31 <sup>s</sup> .5 <sup>s</sup>
21	42 <sup>s</sup> .99 <sup>s</sup>	42 <sup>s</sup> .4 <sup>s</sup>	3 <sup>s</sup> .01 <sup>s</sup>	23 <sup>s</sup> .8 <sup>s</sup>	45 <sup>s</sup> .07 <sup>s</sup>	32 <sup>s</sup> .9 <sup>s</sup>
	<sup>s</sup> 06	<sup>s</sup> 28	<sup>s</sup> 05	<sup>s</sup> 06	<sup>s</sup> 06	<sup>s</sup> 14
May 1	43 <sup>s</sup> .05 <sup>s</sup>	45 <sup>s</sup> .2 <sup>s</sup>	3 <sup>s</sup> .06 <sup>s</sup>	24 <sup>s</sup> .4 <sup>s</sup>	45 <sup>s</sup> .13 <sup>s</sup>	34 <sup>s</sup> .3 <sup>s</sup>
11	43 <sup>s</sup> .06 <sup>s</sup>	47 <sup>s</sup> .9 <sup>s</sup>	3 <sup>s</sup> .09 <sup>s</sup>	25 <sup>s</sup> .1 <sup>s</sup>	45 <sup>s</sup> .15 <sup>s</sup>	35 <sup>s</sup> .9 <sup>s</sup>
21	43 <sup>s</sup> .01 <sup>s</sup>	50 <sup>s</sup> .4 <sup>s</sup>	3 <sup>s</sup> .09 <sup>s</sup>	25 <sup>s</sup> .9 <sup>s</sup>	45 <sup>s</sup> .15 <sup>s</sup>	37 <sup>s</sup> .5 <sup>s</sup>
31	42 <sup>s</sup> .91 <sup>s</sup>	52 <sup>s</sup> .5 <sup>s</sup>	3 <sup>s</sup> .06 <sup>s</sup>	26 <sup>s</sup> .7 <sup>s</sup>	45 <sup>s</sup> .12 <sup>s</sup>	39 <sup>s</sup> .1 <sup>s</sup>
	<sup>s</sup> 16	<sup>s</sup> 19	<sup>s</sup> 05	<sup>s</sup> 08	<sup>s</sup> 06	<sup>s</sup> 14
June 10	42 <sup>s</sup> .75 <sup>s</sup>	54 <sup>s</sup> .4 <sup>s</sup>	3 <sup>s</sup> .01 <sup>s</sup>	27 <sup>s</sup> .5 <sup>s</sup>	45 <sup>s</sup> .06 <sup>s</sup>	40 <sup>s</sup> .5 <sup>s</sup>
20	42 <sup>s</sup> .55 <sup>s</sup>	55 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .95 <sup>s</sup>	28 <sup>s</sup> .3 <sup>s</sup>	44 <sup>s</sup> .99 <sup>s</sup>	41 <sup>s</sup> .7 <sup>s</sup>
30	42 <sup>s</sup> .31 <sup>s</sup>	56 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .87 <sup>s</sup>	29 <sup>s</sup> .0 <sup>s</sup>	44 <sup>s</sup> .89 <sup>s</sup>	42 <sup>s</sup> .8 <sup>s</sup>
July 10	42 <sup>s</sup> .03 <sup>s</sup>	57 <sup>s</sup> .6 <sup>s</sup>	2 <sup>s</sup> .77 <sup>s</sup>	29 <sup>s</sup> .7 <sup>s</sup>	44 <sup>s</sup> .77 <sup>s</sup>	43 <sup>s</sup> .7 <sup>s</sup>
	<sup>s</sup> 30	<sup>s</sup> 02	<sup>s</sup> 11	<sup>s</sup> 05	<sup>s</sup> 13	<sup>s</sup> 06
20	41 <sup>s</sup> .73 <sup>s</sup>	57 <sup>s</sup> .8 <sup>s</sup>	2 <sup>s</sup> .66 <sup>s</sup>	30 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .64 <sup>s</sup>	44 <sup>s</sup> .3 <sup>s</sup>
30	41 <sup>s</sup> .41 <sup>s</sup>	57 <sup>s</sup> .6 <sup>s</sup>	2 <sup>s</sup> .54 <sup>s</sup>	30 <sup>s</sup> .7 <sup>s</sup>	44 <sup>s</sup> .50 <sup>s</sup>	44 <sup>s</sup> .6 <sup>s</sup>
Aug. 9	41 <sup>s</sup> .08 <sup>s</sup>	56 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .41 <sup>s</sup>	31 <sup>s</sup> .1 <sup>s</sup>	44 <sup>s</sup> .36 <sup>s</sup>	44 <sup>s</sup> .6 <sup>s</sup>
19	40 <sup>s</sup> .76 <sup>s</sup>	55 <sup>s</sup> .9 <sup>s</sup>	2 <sup>s</sup> .28 <sup>s</sup>	31 <sup>s</sup> .3 <sup>s</sup>	44 <sup>s</sup> .21 <sup>s</sup>	44 <sup>s</sup> .4 <sup>s</sup>
	<sup>s</sup> 30	<sup>s</sup> 15	<sup>s</sup> 12	<sup>s</sup> 01	<sup>s</sup> 14	<sup>s</sup> 05
Sept. 29	40 <sup>s</sup> .46 <sup>s</sup>	54 <sup>s</sup> .4 <sup>s</sup>	2 <sup>s</sup> .16 <sup>s</sup>	31 <sup>s</sup> .4 <sup>s</sup>	44 <sup>s</sup> .07 <sup>s</sup>	43 <sup>s</sup> .9 <sup>s</sup>
8	40 <sup>s</sup> .19 <sup>s</sup>	52 <sup>s</sup> .5 <sup>s</sup>	2 <sup>s</sup> .06 <sup>s</sup>	31 <sup>s</sup> .3 <sup>s</sup>	43 <sup>s</sup> .94 <sup>s</sup>	43 <sup>s</sup> .0 <sup>s</sup>
18	39 <sup>s</sup> .98 <sup>s</sup>	50 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .98 <sup>s</sup>	31 <sup>s</sup> .0 <sup>s</sup>	43 <sup>s</sup> .84 <sup>s</sup>	41 <sup>s</sup> .9 <sup>s</sup>
28	39 <sup>s</sup> .83 <sup>s</sup>	48 <sup>s</sup> .2 <sup>s</sup>	1 <sup>s</sup> .92 <sup>s</sup>	30 <sup>s</sup> .5 <sup>s</sup>	43 <sup>s</sup> .76 <sup>s</sup>	40 <sup>s</sup> .5 <sup>s</sup>
	<sup>s</sup> 08	<sup>s</sup> 24	<sup>s</sup> 02	<sup>s</sup> 06	<sup>s</sup> 05	<sup>s</sup> 17
Oct. 8	39 <sup>s</sup> .75 <sup>s</sup>	45 <sup>s</sup> .8 <sup>s</sup>	1 <sup>s</sup> .90 <sup>s</sup>	29 <sup>s</sup> .9 <sup>s</sup>	43 <sup>s</sup> .71 <sup>s</sup>	38 <sup>s</sup> .8 <sup>s</sup>
18	39 <sup>s</sup> .76 <sup>s</sup>	43 <sup>s</sup> .4 <sup>s</sup>	1 <sup>s</sup> .92 <sup>s</sup>	28 <sup>s</sup> .9 <sup>s</sup>	43 <sup>s</sup> .70 <sup>s</sup>	36 <sup>s</sup> .8 <sup>s</sup>
28	39 <sup>s</sup> .86 <sup>s</sup>	40 <sup>s</sup> .9 <sup>s</sup>	1 <sup>s</sup> .99 <sup>s</sup>	27 <sup>s</sup> .6 <sup>s</sup>	43 <sup>s</sup> .75 <sup>s</sup>	34 <sup>s</sup> .4 <sup>s</sup>
Nov. 7	40 <sup>s</sup> .06 <sup>s</sup>	38 <sup>s</sup> .8 <sup>s</sup>	2 <sup>s</sup> .11 <sup>s</sup>	26 <sup>s</sup> .1 <sup>s</sup>	43 <sup>s</sup> .84 <sup>s</sup>	31 <sup>s</sup> .9 <sup>s</sup>
	<sup>s</sup> 28	<sup>s</sup> 17	<sup>s</sup> 16	<sup>s</sup> 16	<sup>s</sup> 14	<sup>s</sup> 26
17	40 <sup>s</sup> .34 <sup>s</sup>	37 <sup>s</sup> .1 <sup>s</sup>	2 <sup>s</sup> .27 <sup>s</sup>	24 <sup>s</sup> .5 <sup>s</sup>	43 <sup>s</sup> .98 <sup>s</sup>	29 <sup>s</sup> .3 <sup>s</sup>
27	40 <sup>s</sup> .70 <sup>s</sup>	35 <sup>s</sup> .7 <sup>s</sup>	2 <sup>s</sup> .48 <sup>s</sup>	22 <sup>s</sup> .6 <sup>s</sup>	44 <sup>s</sup> .17 <sup>s</sup>	26 <sup>s</sup> .5 <sup>s</sup>
Dec. 7	41 <sup>s</sup> .13 <sup>s</sup>	34 <sup>s</sup> .8 <sup>s</sup>	2 <sup>s</sup> .73 <sup>s</sup>	20 <sup>s</sup> .5 <sup>s</sup>	44 <sup>s</sup> .41 <sup>s</sup>	23 <sup>s</sup> .8 <sup>s</sup>
17	41 <sup>s</sup> .62 <sup>s</sup>	34 <sup>s</sup> .3 <sup>s</sup>	3 <sup>s</sup> .01 <sup>s</sup>	18 <sup>s</sup> .4 <sup>s</sup>	44 <sup>s</sup> .68 <sup>s</sup>	21 <sup>s</sup> .0 <sup>s</sup>
	<sup>s</sup> 53	<sup>s</sup> 01	<sup>s</sup> 31	<sup>s</sup> 22	<sup>s</sup> 30	<sup>s</sup> 26
27	42 <sup>s</sup> .15 <sup>s</sup>	34 <sup>s</sup> .4 <sup>s</sup>	3 <sup>s</sup> .32 <sup>s</sup>	16 <sup>s</sup> .2 <sup>s</sup>	44 <sup>s</sup> .98 <sup>s</sup>	18 <sup>s</sup> .4 <sup>s</sup>
37	42 <sup>s</sup> .71 <sup>s</sup>	35 <sup>s</sup> .0 <sup>s</sup>	3 <sup>s</sup> .64 <sup>s</sup>	14 <sup>s</sup> .1 <sup>s</sup>	45 <sup>s</sup> .30 <sup>s</sup>	15 <sup>s</sup> .9 <sup>s</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\rho$ Bootis.			$\alpha$ Centauri.			$\epsilon$ Bootis.		
	R. A.	Dec. North.		R. A.	Dec. South.		R. A.	Dec. North.	
	<sup>h</sup> 14	<sup>m</sup> 26	<sup>°</sup> 30 <sup>'</sup> 56	<sup>h</sup> 14	<sup>m</sup> 30	<sup>°</sup> 60 <sup>'</sup> 17	<sup>h</sup> 14	<sup>m</sup> 39	<sup>°</sup> 27 <sup>'</sup> 37
Jan. 1	12 <sup>s</sup> 06 <sup>s</sup>	32 <sup>s</sup> 8 <sup>s</sup>	46 <sup>s</sup> 26 <sup>s</sup>	16 <sup>s</sup> 6 <sup>s</sup>	16 <sup>s</sup> 87 <sup>s</sup>	22 <sup>s</sup> 2 <sup>s</sup>			
11	12 <sup>s</sup> 40 <sup>s</sup>	30 <sup>s</sup> 4 <sup>s</sup>	46 <sup>s</sup> 80 <sup>s</sup>	16 <sup>s</sup> 9 <sup>s</sup>	17 <sup>s</sup> 20 <sup>s</sup>	19 <sup>s</sup> 8 <sup>s</sup>			
21	12 <sup>s</sup> 75 <sup>s</sup>	28 <sup>s</sup> 5 <sup>s</sup>	47 <sup>s</sup> 35 <sup>s</sup>	17 <sup>s</sup> 7 <sup>s</sup>	17 <sup>s</sup> 54 <sup>s</sup>	17 <sup>s</sup> 8 <sup>s</sup>			
31	13 <sup>s</sup> 09 <sup>s</sup>	27 <sup>s</sup> 0 <sup>s</sup>	47 <sup>s</sup> 90 <sup>s</sup>	18 <sup>s</sup> 9 <sup>s</sup>	17 <sup>s</sup> 88 <sup>s</sup>	16 <sup>s</sup> 2 <sup>s</sup>			
		0 <sup>s</sup> 33 <sup>s</sup>		0 <sup>s</sup> 54 <sup>s</sup>		0 <sup>s</sup> 33 <sup>s</sup>			
Feb. 10	13 <sup>s</sup> 42 <sup>s</sup>	26 <sup>s</sup> 0 <sup>s</sup>	48 <sup>s</sup> 44 <sup>s</sup>	20 <sup>s</sup> 6 <sup>s</sup>	18 <sup>s</sup> 21 <sup>s</sup>	15 <sup>s</sup> 0 <sup>s</sup>			
20	13 <sup>s</sup> 74 <sup>s</sup>	25 <sup>s</sup> 5 <sup>s</sup>	48 <sup>s</sup> 94 <sup>s</sup>	22 <sup>s</sup> 6 <sup>s</sup>	18 <sup>s</sup> 52 <sup>s</sup>	14 <sup>s</sup> 3 <sup>s</sup>			
Mar. 2	14 <sup>s</sup> 03 <sup>s</sup>	25 <sup>s</sup> 5 <sup>s</sup>	49 <sup>s</sup> 40 <sup>s</sup>	24 <sup>s</sup> 9 <sup>s</sup>	18 <sup>s</sup> 81 <sup>s</sup>	14 <sup>s</sup> 2 <sup>s</sup>			
12	14 <sup>s</sup> 29 <sup>s</sup>	26 <sup>s</sup> 1 <sup>s</sup>	49 <sup>s</sup> 82 <sup>s</sup>	27 <sup>s</sup> 4 <sup>s</sup>	19 <sup>s</sup> 07 <sup>s</sup>	14 <sup>s</sup> 6 <sup>s</sup>			
		0 <sup>s</sup> 22 <sup>s</sup>		0 <sup>s</sup> 36 <sup>s</sup>		0 <sup>s</sup> 8 <sup>s</sup>			
22	14 <sup>s</sup> 51 <sup>s</sup>	27 <sup>s</sup> 2 <sup>s</sup>	50 <sup>s</sup> 18 <sup>s</sup>	30 <sup>s</sup> 1 <sup>s</sup>	19 <sup>s</sup> 29 <sup>s</sup>	15 <sup>s</sup> 4 <sup>s</sup>			
Apr. 1	14 <sup>s</sup> 69 <sup>s</sup>	28 <sup>s</sup> 6 <sup>s</sup>	50 <sup>s</sup> 48 <sup>s</sup>	32 <sup>s</sup> 9 <sup>s</sup>	19 <sup>s</sup> 48 <sup>s</sup>	16 <sup>s</sup> 6 <sup>s</sup>			
11	14 <sup>s</sup> 84 <sup>s</sup>	30 <sup>s</sup> 3 <sup>s</sup>	50 <sup>s</sup> 73 <sup>s</sup>	35 <sup>s</sup> 8 <sup>s</sup>	19 <sup>s</sup> 64 <sup>s</sup>	18 <sup>s</sup> 2 <sup>s</sup>			
21	14 <sup>s</sup> 94 <sup>s</sup>	32 <sup>s</sup> 3 <sup>s</sup>	50 <sup>s</sup> 92 <sup>s</sup>	38 <sup>s</sup> 6 <sup>s</sup>	19 <sup>s</sup> 76 <sup>s</sup>	20 <sup>s</sup> 0 <sup>s</sup>			
		0 <sup>s</sup> 07 <sup>s</sup>		0 <sup>s</sup> 13 <sup>s</sup>		0 <sup>s</sup> 08 <sup>s</sup>			
May 1	15 <sup>s</sup> 01 <sup>s</sup>	34 <sup>s</sup> 4 <sup>s</sup>	51 <sup>s</sup> 05 <sup>s</sup>	41 <sup>s</sup> 4 <sup>s</sup>	19 <sup>s</sup> 84 <sup>s</sup>	22 <sup>s</sup> 0 <sup>s</sup>			
11	15 <sup>s</sup> 04 <sup>s</sup>	36 <sup>s</sup> 5 <sup>s</sup>	51 <sup>s</sup> 12 <sup>s</sup>	44 <sup>s</sup> 1 <sup>s</sup>	19 <sup>s</sup> 89 <sup>s</sup>	24 <sup>s</sup> 0 <sup>s</sup>			
21	15 <sup>s</sup> 04 <sup>s</sup>	38 <sup>s</sup> 7 <sup>s</sup>	51 <sup>s</sup> 13 <sup>s</sup>	46 <sup>s</sup> 6 <sup>s</sup>	19 <sup>s</sup> 91 <sup>s</sup>	26 <sup>s</sup> 1 <sup>s</sup>			
31	15 <sup>s</sup> 01 <sup>s</sup>	40 <sup>s</sup> 7 <sup>s</sup>	51 <sup>s</sup> 08 <sup>s</sup>	48 <sup>s</sup> 9 <sup>s</sup>	19 <sup>s</sup> 90 <sup>s</sup>	28 <sup>s</sup> 1 <sup>s</sup>			
		0 <sup>s</sup> 06 <sup>s</sup>		0 <sup>s</sup> 11 <sup>s</sup>		0 <sup>s</sup> 05 <sup>s</sup>			
June 10	14 <sup>s</sup> 95 <sup>s</sup>	42 <sup>s</sup> 6 <sup>s</sup>	50 <sup>s</sup> 97 <sup>s</sup>	51 <sup>s</sup> 0 <sup>s</sup>	19 <sup>s</sup> 85 <sup>s</sup>	29 <sup>s</sup> 9 <sup>s</sup>			
20	14 <sup>s</sup> 87 <sup>s</sup>	44 <sup>s</sup> 3 <sup>s</sup>	50 <sup>s</sup> 81 <sup>s</sup>	52 <sup>s</sup> 8 <sup>s</sup>	19 <sup>s</sup> 78 <sup>s</sup>	31 <sup>s</sup> 6 <sup>s</sup>			
30	14 <sup>s</sup> 76 <sup>s</sup>	45 <sup>s</sup> 7 <sup>s</sup>	50 <sup>s</sup> 59 <sup>s</sup>	54 <sup>s</sup> 2 <sup>s</sup>	19 <sup>s</sup> 68 <sup>s</sup>	33 <sup>s</sup> 0 <sup>s</sup>			
July 10	14 <sup>s</sup> 62 <sup>s</sup>	46 <sup>s</sup> 7 <sup>s</sup>	50 <sup>s</sup> 33 <sup>s</sup>	55 <sup>s</sup> 2 <sup>s</sup>	19 <sup>s</sup> 56 <sup>s</sup>	34 <sup>s</sup> 2 <sup>s</sup>			
		0 <sup>s</sup> 15 <sup>s</sup>		0 <sup>s</sup> 30 <sup>s</sup>		0 <sup>s</sup> 9 <sup>s</sup>			
20	14 <sup>s</sup> 47 <sup>s</sup>	47 <sup>s</sup> 5 <sup>s</sup>	50 <sup>s</sup> 03 <sup>s</sup>	55 <sup>s</sup> 8 <sup>s</sup>	19 <sup>s</sup> 42 <sup>s</sup>	35 <sup>s</sup> 1 <sup>s</sup>			
30	14 <sup>s</sup> 31 <sup>s</sup>	47 <sup>s</sup> 9 <sup>s</sup>	49 <sup>s</sup> 70 <sup>s</sup>	56 <sup>s</sup> 0 <sup>s</sup>	19 <sup>s</sup> 27 <sup>s</sup>	35 <sup>s</sup> 6 <sup>s</sup>			
Aug. 9	14 <sup>s</sup> 14 <sup>s</sup>	47 <sup>s</sup> 9 <sup>s</sup>	49 <sup>s</sup> 35 <sup>s</sup>	55 <sup>s</sup> 7 <sup>s</sup>	19 <sup>s</sup> 11 <sup>s</sup>	35 <sup>s</sup> 8 <sup>s</sup>			
19	13 <sup>s</sup> 96 <sup>s</sup>	47 <sup>s</sup> 6 <sup>s</sup>	49 <sup>s</sup> 00 <sup>s</sup>	55 <sup>s</sup> 0 <sup>s</sup>	18 <sup>s</sup> 93 <sup>s</sup>	35 <sup>s</sup> 6 <sup>s</sup>			
		0 <sup>s</sup> 17 <sup>s</sup>		0 <sup>s</sup> 35 <sup>s</sup>		0 <sup>s</sup> 6 <sup>s</sup>			
29	13 <sup>s</sup> 79 <sup>s</sup>	46 <sup>s</sup> 9 <sup>s</sup>	48 <sup>s</sup> 65 <sup>s</sup>	53 <sup>s</sup> 9 <sup>s</sup>	18 <sup>s</sup> 76 <sup>s</sup>	35 <sup>s</sup> 0 <sup>s</sup>			
Sept. 8	13 <sup>s</sup> 63 <sup>s</sup>	45 <sup>s</sup> 8 <sup>s</sup>	48 <sup>s</sup> 33 <sup>s</sup>	52 <sup>s</sup> 4 <sup>s</sup>	18 <sup>s</sup> 60 <sup>s</sup>	34 <sup>s</sup> 1 <sup>s</sup>			
18	13 <sup>s</sup> 49 <sup>s</sup>	44 <sup>s</sup> 4 <sup>s</sup>	48 <sup>s</sup> 05 <sup>s</sup>	50 <sup>s</sup> 6 <sup>s</sup>	18 <sup>s</sup> 46 <sup>s</sup>	32 <sup>s</sup> 9 <sup>s</sup>			
28	13 <sup>s</sup> 38 <sup>s</sup>	42 <sup>s</sup> 6 <sup>s</sup>	47 <sup>s</sup> 82 <sup>s</sup>	48 <sup>s</sup> 5 <sup>s</sup>	18 <sup>s</sup> 34 <sup>s</sup>	31 <sup>s</sup> 3 <sup>s</sup>			
		0 <sup>s</sup> 08 <sup>s</sup>		0 <sup>s</sup> 16 <sup>s</sup>		0 <sup>s</sup> 08 <sup>s</sup>			
Oct. 8	13 <sup>s</sup> 30 <sup>s</sup>	40 <sup>s</sup> 5 <sup>s</sup>	47 <sup>s</sup> 66 <sup>s</sup>	46 <sup>s</sup> 2 <sup>s</sup>	18 <sup>s</sup> 26 <sup>s</sup>	29 <sup>s</sup> 4 <sup>s</sup>			
18	13 <sup>s</sup> 27 <sup>s</sup>	38 <sup>s</sup> 1 <sup>s</sup>	47 <sup>s</sup> 59 <sup>s</sup>	43 <sup>s</sup> 8 <sup>s</sup>	18 <sup>s</sup> 22 <sup>s</sup>	27 <sup>s</sup> 2 <sup>s</sup>			
28	13 <sup>s</sup> 29 <sup>s</sup>	35 <sup>s</sup> 4 <sup>s</sup>	47 <sup>s</sup> 61 <sup>s</sup>	41 <sup>s</sup> 5 <sup>s</sup>	18 <sup>s</sup> 22 <sup>s</sup>	24 <sup>s</sup> 7 <sup>s</sup>			
Nov. 7	13 <sup>s</sup> 36 <sup>s</sup>	32 <sup>s</sup> 2 <sup>s</sup>	47 <sup>s</sup> 73 <sup>s</sup>	39 <sup>s</sup> 1 <sup>s</sup>	18 <sup>s</sup> 28 <sup>s</sup>	21 <sup>s</sup> 7 <sup>s</sup>			
		0 <sup>s</sup> 13 <sup>s</sup>		0 <sup>s</sup> 21 <sup>s</sup>		0 <sup>s</sup> 11 <sup>s</sup>			
17	13 <sup>s</sup> 49 <sup>s</sup>	29 <sup>s</sup> 2 <sup>s</sup>	47 <sup>s</sup> 94 <sup>s</sup>	37 <sup>s</sup> 1 <sup>s</sup>	18 <sup>s</sup> 39 <sup>s</sup>	18 <sup>s</sup> 8 <sup>s</sup>			
27	13 <sup>s</sup> 67 <sup>s</sup>	26 <sup>s</sup> 0 <sup>s</sup>	48 <sup>s</sup> 24 <sup>s</sup>	35 <sup>s</sup> 4 <sup>s</sup>	18 <sup>s</sup> 55 <sup>s</sup>	15 <sup>s</sup> 8 <sup>s</sup>			
Dec. 7	13 <sup>s</sup> 89 <sup>s</sup>	22 <sup>s</sup> 9 <sup>s</sup>	48 <sup>s</sup> 62 <sup>s</sup>	34 <sup>s</sup> 1 <sup>s</sup>	18 <sup>s</sup> 76 <sup>s</sup>	12 <sup>s</sup> 7 <sup>s</sup>			
17	14 <sup>s</sup> 16 <sup>s</sup>	19 <sup>s</sup> 9 <sup>s</sup>	49 <sup>s</sup> 07 <sup>s</sup>	33 <sup>s</sup> 2 <sup>s</sup>	19 <sup>s</sup> 02 <sup>s</sup>	9 <sup>s</sup> 7 <sup>s</sup>			
		0 <sup>s</sup> 31 <sup>s</sup>		0 <sup>s</sup> 50 <sup>s</sup>		0 <sup>s</sup> 29 <sup>s</sup>			
27	14 <sup>s</sup> 47 <sup>s</sup>	17 <sup>s</sup> 0 <sup>s</sup>	49 <sup>s</sup> 57 <sup>s</sup>	32 <sup>s</sup> 8 <sup>s</sup>	19 <sup>s</sup> 31 <sup>s</sup>	6 <sup>s</sup> 9 <sup>s</sup>			
37	14 <sup>s</sup> 80 <sup>s</sup>	14 <sup>s</sup> 4 <sup>s</sup>	50 <sup>s</sup> 10 <sup>s</sup>	32 <sup>s</sup> 9 <sup>s</sup>	19 <sup>s</sup> 63 <sup>s</sup>	4 <sup>s</sup> 2 <sup>s</sup>			



## APPARENT PLACES, FOR THE UPPER TRANSIT, AT GREENWICH.

Month and Day.	$\alpha$ Libræ.		$\beta$ Ursæ Minoris.		$\psi$ Bootis.	
	R.A.	Dec. South.	R.A.	Dec. North.	R.A.	Dec. North.
	<sup>h</sup> 14 <sup>m</sup> 43	<sup>°</sup> 15 <sup>'</sup> 29	<sup>h</sup> 14 <sup>m</sup> 51	<sup>°</sup> 74 <sup>'</sup> 40	<sup>h</sup> 14 <sup>m</sup> 58	<sup>°</sup> 27 <sup>'</sup> 27
Jan. 1	<sup>s</sup> 39.75 <sup>s</sup> 0.32	<sup>"</sup> 48.9 <sup>"</sup> 1.6	<sup>s</sup> 3.32 <sup>s</sup> 0.79	<sup>"</sup> 61.7 <sup>"</sup> 2.2	<sup>s</sup> 50.87 <sup>s</sup> 0.31	<sup>"</sup> 20.0 <sup>"</sup> 2.5
11	40.07   0.33	50.5   1.7	4.11   0.87	59.5   1.8	51.18   0.33	17.5   2.1
21	40.40   0.32	52.2   1.7	4.98   0.90	57.7   1.1	51.51   0.33	15.4   1.8
31	40.72   0.31	53.9   1.6	5.88   0.90	56.6   0.4	51.84   0.33	13.6   1.2
Feb. 10	41.03   0.31	55.5   1.5	6.78   0.89	56.2   0.3	52.17   0.32	12.4   0.8
20	41.34   0.28	57.0   1.4	7.67   0.84	56.5   0.9	52.49   0.30	11.6   0.3
Mar. 2	41.62   0.25	58.4   1.3	8.51   0.75	57.4   1.5	52.79   0.27	11.3   0.3
12	41.87   0.22	59.7   1.1	9.26   0.64	58.9   2.1	53.06   0.24	11.6   0.7
22	42.09   0.19	60.8   0.9	9.90   0.52	61.0   2.5	53.30   0.21	12.3   1.2
Apr. 1	42.28   0.17	61.7   0.7	10.42   0.39	63.5   2.8	53.51   0.17	13.5   1.5
11	42.45   0.14	62.4   0.6	10.81   0.25	66.3   3.0	53.68   0.14	15.0   1.8
21	42.59   0.10	63.0   0.4	11.06   0.10	69.3   3.2	53.82   0.11	16.8   2.0
May 1	42.69   0.08	63.4   0.2	11.16   0.04	72.5   3.1	53.93   0.07	18.8   2.1
11	42.77   0.05	63.6   0.2	11.12   0.17	75.6   3.0	54.00   0.03	20.9   2.1
21	42.82   0.02	63.8   0.0	10.95   0.30	78.6   2.8	54.03   0.00	23.0   2.1
31	42.84   0.00	63.8   0.1	10.65   0.42	81.4   2.4	54.03   0.02	25.1   1.9
June 10	42.84   0.04	63.7   0.1	10.23   0.52	83.8   2.1	54.01   0.06	27.0   1.8
20	42.80   0.06	63.6   0.2	9.71   0.61	85.9   1.6	53.95   0.09	28.8   1.5
30	42.74   0.08	63.4   0.3	9.10   0.67	87.5   1.2	53.86   0.11	30.3   1.3
July 10	42.66   0.11	63.1   0.3	8.43   0.73	88.7   0.6	53.75   0.14	31.6   1.0
20	42.55   0.12	62.8   0.4	7.70   0.76	89.3   0.1	53.61   0.15	32.6   0.7
30	42.43   0.14	62.4   0.4	6.94   0.78	89.4   0.4	53.46   0.17	33.3   0.3
Aug. 9	42.29   0.15	62.0   0.6	6.16   0.78	89.0   0.9	53.29   0.17	33.6   0.0
19	42.14   0.14	61.4   0.4	5.38   0.76	88.1   1.4	53.12   0.18	33.6   0.4
29	42.00   0.14	61.0   0.5	4.62   0.72	86.7   2.0	52.94   0.17	33.2   0.8
Sept. 8	41.86   0.12	60.5   0.4	3.90   0.67	84.7   2.4	52.77   0.16	32.4   1.1
18	41.74   0.10	60.1   0.4	3.23   0.58	82.3   2.8	52.61   0.13	31.3   1.5
28	41.64   0.07	59.7   0.3	2.65   0.48	79.5   3.2	52.48   0.10	29.8   1.8
Oct. 8	41.57   0.03	59.4   0.1	2.17   0.38	76.3   3.4	52.38   0.07	28.0   2.1
18	41.54   0.02	59.3   0.1	1.79   0.25	72.9   3.7	52.31   0.02	25.9   2.4
28	41.56   0.09	59.4   0.3	1.54   0.10	69.2   3.9	52.29   0.02	23.5   2.7
Nov. 7	41.65   0.12	59.7   0.5	{1.44}   0.06	{64.3}   3.9	52.31   0.10	20.8   3.1
17	41.77   0.18	60.2   0.8	1.50   0.21	61.0   3.8	52.41   0.14	17.7   3.0
27	41.95   0.22	61.0   1.0	1.71   0.37	57.2   3.7	52.55   0.19	14.7   3.1
Dec. 7	42.17   0.26	62.0   1.3	2.08   0.51	53.5   3.5	52.74   0.24	11.6   3.0
17	42.43   0.30	63.3   1.4	2.59   0.64	50.0   3.1	52.98   0.27	8.6   2.9
27	42.73   0.31	64.7   1.6	3.23   0.74	46.9   2.6	53.25   0.31	5.7   2.6
37	43.04   0.31	66.3   1.6	3.97   0.74	44.3   2.6	53.56   0.31	3.1   2.6



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Libræ.		$\alpha$ Coronæ Borealis.		$\alpha$ Serpentis.	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 15 <sup>m</sup> 9	<sup>°</sup> 8 <sup>'</sup> 53	<sup>h</sup> 15 <sup>m</sup> 29	<sup>°</sup> 27 <sup>'</sup> 8	<sup>h</sup> 15 <sup>m</sup> 37	<sup>°</sup> 6 <sup>'</sup> 50
Jan. 1	59° 05' 0.30	56° 7' 1.7	9° 15' 0.30	72° 6' 2.6	50° 05' 0.28	15° 2' 2.1
11	59° 35' 0.32	58° 4' 1.7	9° 45' 0.31	70° 0' 2.3	50° 33' 0.30	13° 1' 2.0
21	59° 67' 0.31	60° 1' 1.6	9° 76' 0.33	67° 7' 1.9	50° 63' 0.30	11° 1' 1.8
31	59° 98' 0.31	61° 7' 1.5	10° 09' 0.33	65° 8' 1.5	50° 93' 0.31	9° 3' 1.5
Feb. 10	60° 29' 0.30	63° 2' 1.4	10° 42' 0.32	64° 3' 0.9	51° 24' 0.30	7° 8' 1.2
20	60° 59' 0.29	64° 6' 1.2	10° 74' 0.31	63° 4' 0.4	51° 54' 0.29	6° 6' 0.8
Mar. 2	60° 88' 0.26	65° 8' 0.9	11° 05' 0.29	63° 0' 0.6	51° 83' 0.27	5° 8' 0.5
12	61° 14' 0.24	66° 7' 0.8	11° 34' 0.26	63° 0' 0.6	52° 10' 0.25	5° 3' 0.1
22	61° 38' 0.21	67° 5' 0.5	11° 60' 0.24	63° 6' 1.0	52° 35' 0.23	5° 2' 0.2
Apr. 1	61° 59' 0.18	68° 0' 0.3	11° 84' 0.20	64° 6' 1.5	52° 58' 0.20	5° 4' 0.5
11	61° 77' 0.16	68° 3' 0.1	12° 04' 0.17	66° 1' 1.7	52° 78' 0.18	5° 9' 0.8
21	61° 93' 0.13	68° 4' 0.1	12° 21' 0.13	67° 8' 2.0	52° 96' 0.14	6° 7' 1.0
May 1	62° 06' 0.10	68° 3' 0.2	12° 34' 0.10	69° 8' 2.1	53° 10' 0.12	7° 7' 1.2
11	62° 16' 0.07	68° 1' 0.3	12° 44' 0.07	71° 9' 2.2	53° 22' 0.09	8° 9' 1.2
21	62° 23' 0.05	67° 8' 0.3	12° 51' 0.03	74° 1' 2.1	53° 31' 0.06	10° 1' 1.2
31	62° 28' 0.01	67° 5' 0.4	12° 54' 0.00	76° 2' 2.1	53° 37' 0.03	11° 4' 1.3
June 10	62° 29' 0.02	67° 1' 0.5	12° 54' 0.03	78° 3' 2.0	53° 40' 0.00	12° 7' 1.2
20	62° 27' 0.04	66° 6' 0.4	12° 51' 0.07	80° 3' 1.7	53° 40' 0.03	13° 9' 1.1
30	62° 23' 0.07	66° 2' 0.5	12° 44' 0.10	82° 0' 1.5	53° 37' 0.06	15° 0' 1.0
July 10	62° 16' 0.09	65° 7' 0.4	12° 34' 0.12	83° 5' 1.2	53° 31' 0.09	16° 0' 0.9
20	62° 07' 0.12	65° 3' 0.5	12° 22' 0.15	84° 7' 0.9	53° 22' 0.12	16° 9' 0.7
30	61° 95' 0.13	64° 8' 0.4	12° 07' 0.17	85° 6' 0.6	53° 10' 0.13	17° 6' 0.6
Aug. 9	61° 82' 0.15	64° 4' 0.3	11° 90' 0.18	86° 2' 0.2	52° 97' 0.15	18° 2' 0.3
19	61° 67' 0.15	64° 1' 0.4	11° 72' 0.19	86° 4' 0.2	52° 82' 0.16	18° 5' 0.1
29	61° 52' 0.14	63° 7' 0.2	11° 53' 0.18	86° 2' 0.6	52° 66' 0.16	18° 6' 0.0
Sept. 8	61° 38' 0.13	63° 5' 0.2	11° 35' 0.17	85° 6' 0.9	52° 50' 0.15	18° 6' 0.3
18	61° 25' 0.12	63° 3' 0.0	11° 18' 0.16	84° 7' 1.3	52° 35' 0.13	18° 3' 0.5
28	61° 13' 0.09	63° 3' 0.1	11° 02' 0.13	83° 4' 1.6	52° 22' 0.11	17° 8' 0.8
Oct. 8	61° 04' 0.05	63° 4' 0.2	10° 89' 0.10	81° 8' 2.0	52° 11' 0.08	17° 0' 1.0
18	60° 99' 0.01	63° 6' 0.4	10° 79' 0.05	79° 8' 2.3	52° 03' 0.04	16° 0' 1.3
28	60° 98' 0.05	64° 0' 0.7	10° 74' 0.00	77° 5' 2.5	51° 99' 0.01	14° 7' 1.5
Nov. 7	61° 03' 0.10	64° 7' 0.9	10° 74' 0.05	75° 0' 3.0	52° 00' 0.05	13° 2' 1.7
17	61° 13' 0.15	65° 6' 1.1	10° 79' 0.11	72° 0' 3.0	52° 05' 0.12	11° 5' 2.1
27	61° 28' 0.19	66° 7' 1.3	10° 90' 0.15	69° 0' 3.1	52° 17' 0.15	9° 4' 2.1
Dec. 7	61° 47' 0.23	68° 0' 1.5	11° 05' 0.21	65° 9' 3.0	52° 32' 0.21	7° 3' 2.2
17	61° 70' 0.27	69° 5' 1.6	11° 26' 0.25	62° 9' 3.0	52° 53' 0.24	5° 1' 2.3
27	61° 97' 0.30	71° 1' 1.7	11° 51' 0.28	59° 9' 2.8	52° 77' 0.27	2° 8' 2.2
37	62° 27' 0.30	72° 8' 1.7	11° 79' 0.30	57° 1' 2.8	53° 04' 0.27	0° 6' 2.2



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ζ Ursæ Minoris.		β Scorpii.		δ Ophiuchi.	
	R. A.	Dec. North.	R. A.	Dec. South.	R. A.	Dec. South.
	<sup>h</sup> 15 <sup>m</sup> 48	<sup>°</sup> 78 <sup>'</sup> 11	<sup>h</sup> 15 <sup>m</sup> 57	<sup>°</sup> 19 <sup>'</sup> 26	<sup>h</sup> 16 <sup>m</sup> 7	<sup>°</sup> 3 <sup>'</sup> 21
Jan. 1	40° 57' 0.81	28° 7' 2.8	50° 78' 0.30	40° 1' 1.1	30° 04' 0.26	20° 9' 1.7
11	41° 38' 0.94	25° 9' 2.4	51° 08' 0.31	41° 2' 1.2	30° 30' 0.29	22° 6' 1.7
21	42° 32' 1.04	23° 5' 1.8	51° 39' 0.32	42° 4' 1.2	30° 59' 0.30	24° 3' 1.5
31	43° 36' 1.11	21° 7' 1.1	51° 71' 0.32	43° 6' 1.2	30° 89' 0.31	25° 8' 1.4
Feb. 10	44° 47' 1.14	20° 6' 0.5	52° 03' 0.33	44° 8' 1.2	31° 20' 0.30	27° 2' 1.2
20	45° 61' 1.11	20° 1' 0.2	52° 36' 0.31	46° 0' 1.1	31° 50' 0.29	28° 4' 1.0
Mar. 2	46° 72' 1.06	20° 3' 0.9	52° 67' 0.30	47° 1' 0.9	31° 79' 0.28	29° 4' 0.7
12	47° 78' 0.97	21° 2' 1.5	52° 97' 0.28	48° 0' 0.9	32° 07' 0.27	30° 1' 0.4
Apr. 22	48° 75' 0.85	22° 7' 2.0	53° 25' 0.26	48° 9' 0.8	32° 34' 0.25	30° 5' 0.1
1	49° 60' 0.70	24° 7' 2.4	53° 51' 0.24	49° 7' 0.6	32° 59' 0.23	30° 6' 0.1
11	50° 30' 0.53	27° 1' 2.8	53° 75' 0.21	50° 3' 0.5	32° 82' 0.20	30° 5' 0.3
21	50° 83' 0.36	29° 9' 3.0	53° 96' 0.18	50° 8' 0.4	33° 02' 0.18	30° 2' 0.5
May 1	51° 19' 0.17	32° 9' 3.2	54° 14' 0.15	51° 2' 0.3	33° 20' 0.15	29° 7' 0.7
11	51° 36' 0.02	36° 1' 3.2	54° 29' 0.13	51° 5' 0.3	33° 35' 0.12	29° 0' 0.7
21	51° 34' 0.20	39° 3' 3.0	54° 42' 0.10	51° 8' 0.1	33° 47' 0.10	28° 3' 0.8
31	51° 14' 0.36	42° 3' 2.8	54° 52' 0.06	51° 9' 0.1	33° 57' 0.06	27° 5' 0.8
June 10	50° 78' 0.53	45° 1' 2.6	54° 58' 0.02	52° 0' 0.1	33° 63' 0.03	26° 7' 0.8
20	50° 25' 0.68	47° 7' 2.2	54° 60' 0.01	52° 1' 0.0	33° 66' 0.01	25° 9' 0.8
30	49° 57' 0.80	49° 9' 1.9	54° 59' 0.04	52° 1' 0.0	33° 65' 0.03	25° 1' 0.7
July 10	48° 77' 0.90	51° 8' 1.3	54° 55' 0.07	52° 1' 0.1	33° 62' 0.07	24° 4' 0.6
20	47° 87' 0.99	53° 1' 0.9	54° 48' 0.11	52° 0' 0.1	33° 55' 0.10	23° 8' 0.6
30	46° 88' 1.05	54° 0' 0.4	54° 37' 0.13	51° 9' 0.2	33° 45' 0.12	23° 2' 0.4
Aug. 9	45° 83' 1.09	54° 4' 0.1	54° 24' 0.15	51° 7' 0.2	33° 33' 0.14	22° 8' 0.4
19	44° 74' 1.10	54° 3' 0.7	54° 09' 0.16	51° 5' 0.2	33° 19' 0.16	22° 4' 0.2
29	43° 64' 1.09	53° 6' 1.2	53° 93' 0.17	51° 3' 0.4	33° 03' 0.16	22° 2' 0.1
Sept. 8	42° 55' 1.05	52° 4' 1.7	53° 76' 0.16	50° 9' 0.3	32° 87' 0.16	22° 1' 0.0
18	41° 50' 0.97	50° 7' 2.1	53° 60' 0.15	50° 6' 0.3	32° 71' 0.15	22° 1' 0.1
28	40° 53' 0.88	48° 6' 2.5	53° 45' 0.13	50° 3' 0.3	32° 56' 0.13	22° 2' 0.3
Oct. 8	39° 65' 0.77	46° 1' 3.0	53° 32' 0.09	50° 0' 0.3	32° 43' 0.10	22° 5' 0.5
18	38° 88' 0.62	43° 1' 3.3	53° 23' 0.05	49° 7' 0.1	32° 33' 0.05	23° 0' 0.7
28	38° 26' 0.45	39° 8' 3.5	53° 18' 0.00	49° 6' 0.1	32° 28' 0.02	23° 7' 0.9
Nov. 7	37° 81' 0.27	36° 3' 3.7	53° 18' 0.05	49° 5' 0.1	32° 26' 0.03	24° 6' 1.1
17	37° 54' 0.07	32° 6' 4.2	53° 23' 0.11	49° 6' 0.4	32° 29' 0.09	25° 7' 1.3
27	37° 47' 0.15	28° 4' 3.8	53° 34' 0.16	50° 0' 0.5	32° 38' 0.14	27° 0' 1.5
Dec. 7	37° 62' 0.35	24° 6' 3.7	53° 50' 0.21	50° 5' 0.7	32° 52' 0.18	28° 5' 1.6
17	37° 97' 0.55	20° 9' 3.5	53° 71' 0.25	51° 2' 0.8	32° 70' 0.22	30° 1' 1.7
27	38° 52' 0.72	17° 4' 3.1	53° 96' 0.28	52° 0' 1.0	32° 92' 0.26	31° 8' 1.7
37	39° 24' 0.88	14° 3' 3.1	54° 24' 0.32	53° 0' 1.2	33° 18' 0.30	33° 5' 1.7



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Scorpii. (Antares)			$\eta$ Draconis.			$\alpha$ Trianguli Australis.		
	R. A.		Dec. South.	R. A.		Dec. North.	R. A.		Dec. South.
	<sup>h</sup> 16	<sup>m</sup> 21	<sup>°</sup> 26 <sup>'</sup> 8	<sup>h</sup> 16	<sup>m</sup> 22	<sup>°</sup> 61 <sup>'</sup> 48	<sup>h</sup> 16	<sup>m</sup> 34	<sup>°</sup> 68 <sup>'</sup> 46
Jan. 1	24 <sup>s</sup> 12 <sup>s</sup>	0 <sup>s</sup> 29	17 <sup>°</sup> 0 <sup>'</sup>	12 <sup>s</sup> 02 <sup>s</sup>	0 <sup>s</sup> 36	28 <sup>s</sup> 7 <sup>s</sup>	50 <sup>s</sup> 89 <sup>s</sup>	0 <sup>s</sup> 59	47 <sup>°</sup> 8 <sup>'</sup>
11	24 <sup>s</sup> 41 <sup>s</sup>	0 <sup>s</sup> 31	17 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 38 <sup>s</sup>	0 <sup>s</sup> 42	25 <sup>s</sup> 4 <sup>s</sup> 3 <sup>"</sup>	51 <sup>s</sup> 48 <sup>s</sup>	0 <sup>s</sup> 66	46 <sup>°</sup> 4 <sup>'</sup> 1 <sup>"</sup>
21	24 <sup>s</sup> 72 <sup>s</sup>	0 <sup>s</sup> 33	18 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 80 <sup>s</sup>	0 <sup>s</sup> 47	22 <sup>s</sup> 6 <sup>s</sup> 2 <sup>"</sup>	52 <sup>s</sup> 14 <sup>s</sup>	0 <sup>s</sup> 71	45 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
31	25 <sup>s</sup> 05 <sup>s</sup>	0 <sup>s</sup> 34	19 <sup>°</sup> 2 <sup>'</sup> 0 <sup>"</sup>	13 <sup>s</sup> 27 <sup>s</sup>	0 <sup>s</sup> 50	20 <sup>s</sup> 3 <sup>s</sup> 1 <sup>"</sup>	52 <sup>s</sup> 85 <sup>s</sup>	0 <sup>s</sup> 74	44 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>
Feb. 10	25 <sup>s</sup> 39 <sup>s</sup>	0 <sup>s</sup> 33	20 <sup>°</sup> 1 <sup>'</sup> 0 <sup>"</sup>	13 <sup>s</sup> 77 <sup>s</sup>	0 <sup>s</sup> 52	18 <sup>s</sup> 5 <sup>s</sup> 1 <sup>"</sup>	53 <sup>s</sup> 59 <sup>s</sup>	0 <sup>s</sup> 77	44 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
20	25 <sup>s</sup> 72 <sup>s</sup>	0 <sup>s</sup> 33	21 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	14 <sup>s</sup> 29 <sup>s</sup>	0 <sup>s</sup> 53	17 <sup>s</sup> 4 <sup>s</sup> 0 <sup>"</sup>	54 <sup>s</sup> 36 <sup>s</sup>	0 <sup>s</sup> 76	44 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>
Mar. 2	26 <sup>s</sup> 05 <sup>s</sup>	0 <sup>s</sup> 32	22 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	14 <sup>s</sup> 82 <sup>s</sup>	0 <sup>s</sup> 51	17 <sup>s</sup> 0 <sup>s</sup> 2 <sup>"</sup>	55 <sup>s</sup> 12 <sup>s</sup>	0 <sup>s</sup> 74	45 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
12	26 <sup>s</sup> 37 <sup>s</sup>	0 <sup>s</sup> 31	22 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>	15 <sup>s</sup> 33 <sup>s</sup>	0 <sup>s</sup> 48	17 <sup>s</sup> 2 <sup>s</sup> 0 <sup>"</sup>	55 <sup>s</sup> 86 <sup>s</sup>	0 <sup>s</sup> 72	46 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
22	26 <sup>s</sup> 68 <sup>s</sup>	0 <sup>s</sup> 29	23 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>	15 <sup>s</sup> 81 <sup>s</sup>	0 <sup>s</sup> 44	18 <sup>s</sup> 1 <sup>s</sup> 1 <sup>"</sup>	56 <sup>s</sup> 58 <sup>s</sup>	0 <sup>s</sup> 68	47 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
Apr. 1	26 <sup>s</sup> 97 <sup>s</sup>	0 <sup>s</sup> 26	24 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>	16 <sup>s</sup> 25 <sup>s</sup>	0 <sup>s</sup> 39	19 <sup>s</sup> 6 <sup>s</sup> 2 <sup>"</sup>	57 <sup>s</sup> 26 <sup>s</sup>	0 <sup>s</sup> 63	48 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>
11	27 <sup>s</sup> 23 <sup>s</sup>	0 <sup>s</sup> 24	25 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	16 <sup>s</sup> 64 <sup>s</sup>	0 <sup>s</sup> 33	21 <sup>s</sup> 7 <sup>s</sup> 2 <sup>"</sup>	57 <sup>s</sup> 89 <sup>s</sup>	0 <sup>s</sup> 57	50 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>
21	27 <sup>s</sup> 47 <sup>s</sup>	0 <sup>s</sup> 22	26 <sup>°</sup> 1 <sup>'</sup> 0 <sup>"</sup>	16 <sup>s</sup> 97 <sup>s</sup>	0 <sup>s</sup> 26	24 <sup>s</sup> 2 <sup>s</sup> 2 <sup>"</sup>	58 <sup>s</sup> 46 <sup>s</sup>	0 <sup>s</sup> 51	53 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
May 1	27 <sup>s</sup> 69 <sup>s</sup>	0 <sup>s</sup> 19	26 <sup>°</sup> 7 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 23 <sup>s</sup>	0 <sup>s</sup> 19	27 <sup>s</sup> 0 <sup>s</sup> 3 <sup>"</sup>	58 <sup>s</sup> 97 <sup>s</sup>	0 <sup>s</sup> 43	55 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>
11	27 <sup>s</sup> 88 <sup>s</sup>	0 <sup>s</sup> 16	27 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 42 <sup>s</sup>	0 <sup>s</sup> 11	30 <sup>s</sup> 0 <sup>s</sup> 3 <sup>"</sup>	59 <sup>s</sup> 40 <sup>s</sup>	0 <sup>s</sup> 34	57 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>
21	28 <sup>s</sup> 04 <sup>s</sup>	0 <sup>s</sup> 12	27 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 53 <sup>s</sup>	0 <sup>s</sup> 04	33 <sup>s</sup> 2 <sup>s</sup> 3 <sup>"</sup>	59 <sup>s</sup> 74 <sup>s</sup>	0 <sup>s</sup> 26	60 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>
31	28 <sup>s</sup> 16 <sup>s</sup>	0 <sup>s</sup> 09	28 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 57 <sup>s</sup>	0 <sup>s</sup> 04	36 <sup>s</sup> 4 <sup>s</sup> 3 <sup>"</sup>	60 <sup>s</sup> 00 <sup>s</sup>	0 <sup>s</sup> 16	63 <sup>°</sup> 2 <sup>'</sup> 0 <sup>"</sup>
June 10	28 <sup>s</sup> 25 <sup>s</sup>	0 <sup>s</sup> 05	28 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 53 <sup>s</sup>	0 <sup>s</sup> 10	39 <sup>s</sup> 4 <sup>s</sup> 2 <sup>"</sup>	60 <sup>s</sup> 16 <sup>s</sup>	0 <sup>s</sup> 06	65 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>
20	28 <sup>s</sup> 30 <sup>s</sup>	0 <sup>s</sup> 01	29 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 43 <sup>s</sup>	0 <sup>s</sup> 18	42 <sup>s</sup> 3 <sup>s</sup> 2 <sup>"</sup>	60 <sup>s</sup> 22 <sup>s</sup>	0 <sup>s</sup> 04	68 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>
30	28 <sup>s</sup> 31 <sup>s</sup>	0 <sup>s</sup> 02	29 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 25 <sup>s</sup>	0 <sup>s</sup> 25	45 <sup>s</sup> 0 <sup>s</sup> 2 <sup>"</sup>	60 <sup>s</sup> 18 <sup>s</sup>	0 <sup>s</sup> 13	71 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
July 10	28 <sup>s</sup> 29 <sup>s</sup>	0 <sup>s</sup> 06	29 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>	17 <sup>s</sup> 00 <sup>s</sup>	0 <sup>s</sup> 30	47 <sup>s</sup> 4 <sup>s</sup> 1 <sup>"</sup>	60 <sup>s</sup> 05 <sup>s</sup>	0 <sup>s</sup> 23	73 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
20	28 <sup>s</sup> 23 <sup>s</sup>	0 <sup>s</sup> 10	30 <sup>°</sup> 2 <sup>'</sup> 0 <sup>"</sup>	16 <sup>s</sup> 70 <sup>s</sup>	0 <sup>s</sup> 35	49 <sup>s</sup> 3 <sup>s</sup> 1 <sup>"</sup>	59 <sup>s</sup> 82 <sup>s</sup>	0 <sup>s</sup> 32	75 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
30	28 <sup>s</sup> 13 <sup>s</sup>	0 <sup>s</sup> 13	30 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	16 <sup>s</sup> 35 <sup>s</sup>	0 <sup>s</sup> 39	50 <sup>s</sup> 8 <sup>s</sup> 1 <sup>"</sup>	59 <sup>s</sup> 50 <sup>s</sup>	0 <sup>s</sup> 40	77 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
Aug. 9	28 <sup>s</sup> 00 <sup>s</sup>	0 <sup>s</sup> 16	30 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	15 <sup>s</sup> 96 <sup>s</sup>	0 <sup>s</sup> 42	51 <sup>s</sup> 8 <sup>s</sup> 0 <sup>"</sup>	59 <sup>s</sup> 10 <sup>s</sup>	0 <sup>s</sup> 45	78 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>
19	27 <sup>s</sup> 84 <sup>s</sup>	0 <sup>s</sup> 17	30 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	15 <sup>s</sup> 54 <sup>s</sup>	0 <sup>s</sup> 45	52 <sup>s</sup> 4 <sup>s</sup> 0 <sup>"</sup>	58 <sup>s</sup> 65 <sup>s</sup>	0 <sup>s</sup> 49	79 <sup>°</sup> 2 <sup>'</sup> 0 <sup>"</sup>
29	27 <sup>s</sup> 67 <sup>s</sup>	0 <sup>s</sup> 18	30 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	15 <sup>s</sup> 09 <sup>s</sup>	0 <sup>s</sup> 45	52 <sup>s</sup> 4 <sup>s</sup> 0 <sup>"</sup>	58 <sup>s</sup> 16 <sup>s</sup>	0 <sup>s</sup> 51	79 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>
Sept. 8	27 <sup>s</sup> 49 <sup>s</sup>	0 <sup>s</sup> 18	30 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	14 <sup>s</sup> 64 <sup>s</sup>	0 <sup>s</sup> 44	51 <sup>s</sup> 9 <sup>s</sup> 1 <sup>"</sup>	57 <sup>s</sup> 65 <sup>s</sup>	0 <sup>s</sup> 52	79 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>
18	27 <sup>s</sup> 31 <sup>s</sup>	0 <sup>s</sup> 17	29 <sup>°</sup> 7 <sup>'</sup> 0 <sup>"</sup>	14 <sup>s</sup> 20 <sup>s</sup>	0 <sup>s</sup> 43	50 <sup>s</sup> 9 <sup>s</sup> 1 <sup>"</sup>	57 <sup>s</sup> 13 <sup>s</sup>	0 <sup>s</sup> 49	79 <sup>°</sup> 1 <sup>'</sup> 0 <sup>"</sup>
28	27 <sup>s</sup> 14 <sup>s</sup>	0 <sup>s</sup> 15	29 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	13 <sup>s</sup> 77 <sup>s</sup>	0 <sup>s</sup> 40	49 <sup>s</sup> 4 <sup>s</sup> 2 <sup>"</sup>	56 <sup>s</sup> 64 <sup>s</sup>	0 <sup>s</sup> 44	78 <sup>°</sup> 1 <sup>'</sup> 0 <sup>"</sup>
Oct. 8	26 <sup>s</sup> 99 <sup>s</sup>	0 <sup>s</sup> 11	28 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>	13 <sup>s</sup> 37 <sup>s</sup>	0 <sup>s</sup> 35	47 <sup>s</sup> 4 <sup>s</sup> 2 <sup>"</sup>	56 <sup>s</sup> 20 <sup>s</sup>	0 <sup>s</sup> 37	76 <sup>°</sup> 7 <sup>'</sup> 0 <sup>"</sup>
18	26 <sup>s</sup> 88 <sup>s</sup>	0 <sup>s</sup> 08	28 <sup>°</sup> 3 <sup>'</sup> 0 <sup>"</sup>	13 <sup>s</sup> 02 <sup>s</sup>	0 <sup>s</sup> 28	44 <sup>s</sup> 9 <sup>s</sup> 2 <sup>"</sup>	55 <sup>s</sup> 83 <sup>s</sup>	0 <sup>s</sup> 27	74 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>
28	26 <sup>s</sup> 80 <sup>s</sup>	0 <sup>s</sup> 03	27 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 74 <sup>s</sup>	0 <sup>s</sup> 21	42 <sup>s</sup> 0 <sup>s</sup> 3 <sup>"</sup>	55 <sup>s</sup> 56 <sup>s</sup>	0 <sup>s</sup> 16	72 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>
Nov. 7	26 <sup>s</sup> 77 <sup>s</sup>	0 <sup>s</sup> 03	27 <sup>°</sup> 4 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 53 <sup>s</sup>	0 <sup>s</sup> 13	38 <sup>s</sup> 8 <sup>s</sup> 3 <sup>"</sup>	55 <sup>s</sup> 40 <sup>s</sup>	0 <sup>s</sup> 04	70 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>
17	26 <sup>s</sup> 80 <sup>s</sup>	0 <sup>s</sup> 09	27 <sup>°</sup> 1 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 40 <sup>s</sup>	0 <sup>s</sup> 04	35 <sup>s</sup> 3 <sup>s</sup> 3 <sup>"</sup>	55 <sup>s</sup> 36 <sup>s</sup>	0 <sup>s</sup> 09	68 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>
27	26 <sup>s</sup> 89 <sup>s</sup>	0 <sup>s</sup> 15	27 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 36 <sup>s</sup>	0 <sup>s</sup> 05	31 <sup>s</sup> 6 <sup>s</sup> 4 <sup>"</sup>	55 <sup>s</sup> 45 <sup>s</sup>	0 <sup>s</sup> 23	65 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>
Dec. 7	27 <sup>s</sup> 04 <sup>s</sup>	0 <sup>s</sup> 19	27 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 41 <sup>s</sup>	0 <sup>s</sup> 15	27 <sup>s</sup> 4 <sup>s</sup> 3 <sup>"</sup>	55 <sup>s</sup> 68 <sup>s</sup>	0 <sup>s</sup> 34	62 <sup>°</sup> 8 <sup>'</sup> 0 <sup>"</sup>
17	27 <sup>s</sup> 23 <sup>s</sup>	0 <sup>s</sup> 24	27 <sup>°</sup> 5 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 56 <sup>s</sup>	0 <sup>s</sup> 24	23 <sup>s</sup> 6 <sup>s</sup> 3 <sup>"</sup>	56 <sup>s</sup> 02 <sup>s</sup>	0 <sup>s</sup> 46	60 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>
27	27 <sup>s</sup> 47 <sup>s</sup>	0 <sup>s</sup> 28	28 <sup>°</sup> 0 <sup>'</sup> 0 <sup>"</sup>	12 <sup>s</sup> 80 <sup>s</sup>	0 <sup>s</sup> 33	19 <sup>s</sup> 9 <sup>s</sup> 3 <sup>"</sup>	56 <sup>s</sup> 48 <sup>s</sup>	0 <sup>s</sup> 55	58 <sup>°</sup> 6 <sup>'</sup> 0 <sup>"</sup>
37	27 <sup>s</sup> 75 <sup>s</sup>			13 <sup>s</sup> 13 <sup>s</sup>		16 <sup>s</sup> 4 <sup>s</sup> 3 <sup>"</sup>	57 <sup>s</sup> 03 <sup>s</sup>		56 <sup>°</sup> 9 <sup>'</sup> 0 <sup>"</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ζ Herculis.		κ Ophiuchi.		ε Ursæ Minoris.			
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.		
	<sup>h</sup> 16	<sup>m</sup> 36	<sup>°</sup> 31	<sup>'</sup> 50	<sup>h</sup> 16	<sup>m</sup> 59	<sup>°</sup> 82	<sup>'</sup> 14
Jan. 1	21 <sup>s</sup> .07	0 <sup>s</sup> .24	23 <sup>s</sup> .7	28 <sup>s</sup> .89	48 <sup>s</sup> .3	15 <sup>s</sup> .41	46 <sup>s</sup> .1	
11	21 <sup>s</sup> .31	0 <sup>s</sup> .28	20 <sup>s</sup> .8	29 <sup>s</sup> .12	46 <sup>s</sup> .1	16 <sup>s</sup> .14	42 <sup>s</sup> .8	
21	21 <sup>s</sup> .59	0 <sup>s</sup> .30	18 <sup>s</sup> .1	29 <sup>s</sup> .37	44 <sup>s</sup> .1	17 <sup>s</sup> .14	39 <sup>s</sup> .9	
31	21 <sup>s</sup> .89	0 <sup>s</sup> .32	15 <sup>s</sup> .8	29 <sup>s</sup> .64	42 <sup>s</sup> .2	18 <sup>s</sup> .37	37 <sup>s</sup> .4	
Feb. 10	22 <sup>s</sup> .21	0 <sup>s</sup> .33	14 <sup>s</sup> .0	29 <sup>s</sup> .93	40 <sup>s</sup> .6	19 <sup>s</sup> .80	35 <sup>s</sup> .4	
20	22 <sup>s</sup> .54	0 <sup>s</sup> .33	12 <sup>s</sup> .6	30 <sup>s</sup> .22	39 <sup>s</sup> .3	21 <sup>s</sup> .36	34 <sup>s</sup> .0	
Mar. 2	22 <sup>s</sup> .86	0 <sup>s</sup> .32	11 <sup>s</sup> .8	30 <sup>s</sup> .52	38 <sup>s</sup> .4	22 <sup>s</sup> .99	33 <sup>s</sup> .3	
12	23 <sup>s</sup> .18	0 <sup>s</sup> .30	11 <sup>s</sup> .6	30 <sup>s</sup> .81	37 <sup>s</sup> .9	24 <sup>s</sup> .65	33 <sup>s</sup> .2	
Apr. 22	23 <sup>s</sup> .48	0 <sup>s</sup> .29	12 <sup>s</sup> .0	31 <sup>s</sup> .08	37 <sup>s</sup> .8	26 <sup>s</sup> .25	33 <sup>s</sup> .8	
1	23 <sup>s</sup> .77	0 <sup>s</sup> .26	12 <sup>s</sup> .9	31 <sup>s</sup> .35	38 <sup>s</sup> .1	27 <sup>s</sup> .75	35 <sup>s</sup> .0	
11	24 <sup>s</sup> .03	0 <sup>s</sup> .23	14 <sup>s</sup> .2	31 <sup>s</sup> .60	38 <sup>s</sup> .7	29 <sup>s</sup> .09	36 <sup>s</sup> .8	
21	24 <sup>s</sup> .26	0 <sup>s</sup> .20	15 <sup>s</sup> .9	31 <sup>s</sup> .83	39 <sup>s</sup> .7	30 <sup>s</sup> .24	39 <sup>s</sup> .0	
May 1	24 <sup>s</sup> .46	0 <sup>s</sup> .17	18 <sup>s</sup> .0	32 <sup>s</sup> .04	40 <sup>s</sup> .9	31 <sup>s</sup> .16	41 <sup>s</sup> .6	
11	24 <sup>s</sup> .63	0 <sup>s</sup> .13	20 <sup>s</sup> .3	32 <sup>s</sup> .23	42 <sup>s</sup> .3	31 <sup>s</sup> .81	44 <sup>s</sup> .5	
21	24 <sup>s</sup> .76	0 <sup>s</sup> .10	22 <sup>s</sup> .8	32 <sup>s</sup> .38	43 <sup>s</sup> .8	32 <sup>s</sup> .19	47 <sup>s</sup> .6	
31	24 <sup>s</sup> .86	0 <sup>s</sup> .05	25 <sup>s</sup> .4	32 <sup>s</sup> .50	45 <sup>s</sup> .4	32 <sup>s</sup> .29	50 <sup>s</sup> .7	
June 10	24 <sup>s</sup> .91	0 <sup>s</sup> .02	27 <sup>s</sup> .9	32 <sup>s</sup> .59	47 <sup>s</sup> .1	32 <sup>s</sup> .10	53 <sup>s</sup> .8	
20	24 <sup>s</sup> .93	0 <sup>s</sup> .03	30 <sup>s</sup> .4	32 <sup>s</sup> .65	48 <sup>s</sup> .6	31 <sup>s</sup> .64	56 <sup>s</sup> .8	
30	24 <sup>s</sup> .90	0 <sup>s</sup> .06	32 <sup>s</sup> .7	32 <sup>s</sup> .67	50 <sup>s</sup> .1	30 <sup>s</sup> .92	59 <sup>s</sup> .6	
July 10	24 <sup>s</sup> .84	0 <sup>s</sup> .10	34 <sup>s</sup> .7	32 <sup>s</sup> .66	51 <sup>s</sup> .5	29 <sup>s</sup> .95	62 <sup>s</sup> .1	
20	24 <sup>s</sup> .74	0 <sup>s</sup> .14	36 <sup>s</sup> .5	32 <sup>s</sup> .61	52 <sup>s</sup> .8	28 <sup>s</sup> .77	64 <sup>s</sup> .3	
30	24 <sup>s</sup> .60	0 <sup>s</sup> .17	38 <sup>s</sup> .0	32 <sup>s</sup> .52	53 <sup>s</sup> .8	27 <sup>s</sup> .40	66 <sup>s</sup> .1	
Aug. 9	24 <sup>s</sup> .43	0 <sup>s</sup> .19	39 <sup>s</sup> .2	32 <sup>s</sup> .40	54 <sup>s</sup> .6	25 <sup>s</sup> .87	67 <sup>s</sup> .5	
19	24 <sup>s</sup> .24	0 <sup>s</sup> .21	39 <sup>s</sup> .9	32 <sup>s</sup> .26	55 <sup>s</sup> .2	24 <sup>s</sup> .21	68 <sup>s</sup> .4	
29	24 <sup>s</sup> .03	0 <sup>s</sup> .22	40 <sup>s</sup> .3	32 <sup>s</sup> .10	55 <sup>s</sup> .6	22 <sup>s</sup> .47	68 <sup>s</sup> .8	
Sept. 8	23 <sup>s</sup> .81	0 <sup>s</sup> .22	40 <sup>s</sup> .3	31 <sup>s</sup> .93	55 <sup>s</sup> .8	20 <sup>s</sup> .68	68 <sup>s</sup> .7	
18	23 <sup>s</sup> .59	0 <sup>s</sup> .21	39 <sup>s</sup> .8	31 <sup>s</sup> .75	55 <sup>s</sup> .7	18 <sup>s</sup> .89	68 <sup>s</sup> .1	
28	23 <sup>s</sup> .38	0 <sup>s</sup> .20	38 <sup>s</sup> .9	31 <sup>s</sup> .57	55 <sup>s</sup> .3	17 <sup>s</sup> .12	67 <sup>s</sup> .0	
Oct. 8	23 <sup>s</sup> .18	0 <sup>s</sup> .17	37 <sup>s</sup> .7	31 <sup>s</sup> .41	54 <sup>s</sup> .7	15 <sup>s</sup> .44	65 <sup>s</sup> .4	
18	23 <sup>s</sup> .01	0 <sup>s</sup> .13	36 <sup>s</sup> .0	31 <sup>s</sup> .28	53 <sup>s</sup> .8	13 <sup>s</sup> .87	63 <sup>s</sup> .4	
28	22 <sup>s</sup> .88	0 <sup>s</sup> .08	33 <sup>s</sup> .9	31 <sup>s</sup> .18	52 <sup>s</sup> .6	12 <sup>s</sup> .46	60 <sup>s</sup> .9	
Nov. 7	22 <sup>s</sup> .80	0 <sup>s</sup> .04	31 <sup>s</sup> .5	31 <sup>s</sup> .12	51 <sup>s</sup> .2	11 <sup>s</sup> .26	58 <sup>s</sup> .0	
17	22 <sup>s</sup> .76	0 <sup>s</sup> .02	28 <sup>s</sup> .8	31 <sup>s</sup> .10	49 <sup>s</sup> .5	10 <sup>s</sup> .30	54 <sup>s</sup> .8	
27	22 <sup>s</sup> .78	0 <sup>s</sup> .08	25 <sup>s</sup> .9	31 <sup>s</sup> .13	47 <sup>s</sup> .7	9 <sup>s</sup> .60	51 <sup>s</sup> .4	
Dec. 7	22 <sup>s</sup> .86	0 <sup>s</sup> .14	22 <sup>s</sup> .5	31 <sup>s</sup> .21	45 <sup>s</sup> .5	9 <sup>s</sup> .12	48 <sup>s</sup> .7	
17	23 <sup>s</sup> .00	0 <sup>s</sup> .18	19 <sup>s</sup> .3	31 <sup>s</sup> .34	43 <sup>s</sup> .3	9 <sup>s</sup> .38	46 <sup>s</sup> .1	
27	23 <sup>s</sup> .18	0 <sup>s</sup> .23	16 <sup>s</sup> .1	31 <sup>s</sup> .52	41 <sup>s</sup> .0	9 <sup>s</sup> .94	44 <sup>s</sup> .8	
37	23 <sup>s</sup> .41	0 <sup>s</sup> .23	13 <sup>s</sup> .1	31 <sup>s</sup> .73	38 <sup>s</sup> .7		43 <sup>s</sup> .7	



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Herculis.		$\theta$ Ophiuchi.		$\beta$ Draconis.	
	R. A.	Dec. North.	R. A.	Dec. South.	R. A.	Dec. North.
	<sup>h</sup> 17 <sup>m</sup> 8	<sup>o</sup> 14 <sup>'</sup> 32	<sup>h</sup> 17 <sup>m</sup> 13	<sup>o</sup> 24 <sup>'</sup> 51	<sup>h</sup> 17 <sup>m</sup> 27	<sup>o</sup> 52 <sup>'</sup> 23
Jan. 1	41° 05' 0.21	28° 5' 2.4	59° 15' 0.24	51° 6' 0.3	27° 15' 0.21	54° 1' 3.5
11	41° 26' 0.24	26° 1' 2.2	59° 39' 0.28	51° 9' 0.5	27° 36' 0.26	50° 6' 3.3
21	41° 50' 0.27	23° 9' 2.0	59° 67' 0.30	52° 4' 0.5	27° 62' 0.32	47° 3' 2.8
31	41° 77' 0.28	21° 9' 1.7	59° 97' 0.31	52° 9' 0.5	27° 94' 0.36	44° 5' 2.3
Feb. 10	42° 05' 0.29	20° 2' 1.4	60° 28' 0.32	53° 4' 0.6	28° 30' 0.39	42° 2' 1.8
20	42° 34' 0.30	18° 8' 0.9	60° 60' 0.33	54° 0' 0.5	28° 69' 0.40	40° 4' 1.3
Mar. 2	42° 64' 0.29	17° 9' 0.5	60° 93' 0.33	54° 5' 0.5	29° 09' 0.42	39° 1' 0.6
12	42° 93' 0.28	17° 4' 0.1	61° 26' 0.32	55° 0' 0.5	29° 51' 0.41	38° 5' 0.1
22	43° 21' 0.28	17° 3' 0.4	61° 58' 0.31	55° 5' 0.4	29° 92' 0.39	38° 6' 0.8
Apr. 1	43° 49' 0.26	17° 7' 0.7	61° 89' 0.29	55° 9' 0.3	30° 31' 0.37	39° 4' 1.3
11	43° 75' 0.25	18° 4' 1.1	62° 18' 0.28	56° 2' 0.3	30° 68' 0.34	40° 7' 1.9
21	44° 00' 0.22	19° 5' 1.4	62° 46' 0.26	56° 5' 0.3	31° 02' 0.30	42° 6' 2.3
May 1	44° 22' 0.19	20° 9' 1.6	62° 72' 0.24	56° 8' 0.2	31° 32' 0.26	44° 9' 2.7
11	44° 41' 0.17	22° 5' 1.8	62° 96' 0.21	57° 0' 0.3	31° 58' 0.21	47° 6' 2.9
21	44° 58' 0.14	24° 3' 1.9	63° 17' 0.17	57° 3' 0.2	31° 79' 0.15	50° 5' 3.1
31	44° 72' 0.11	26° 2' 1.9	63° 34' 0.14	57° 5' 0.3	31° 94' 0.09	53° 6' 3.2
June 10	44° 83' 0.07	28° 1' 1.9	63° 48' 0.11	57° 8' 0.2	32° 03' 0.03	56° 8' 3.2
20	44° 90' 0.03	30° 0' 1.8	63° 59' 0.06	58° 0' 0.3	32° 06' 0.02	60° 0' 3.0
30	44° 93' 0.01	31° 8' 1.7	63° 65' 0.02	58° 3' 0.3	32° 04' 0.09	63° 0' 2.8
July 10	44° 92' 0.05	33° 5' 1.5	63° 67' 0.02	58° 6' 0.3	31° 95' 0.14	65° 8' 2.6
20	44° 87' 0.08	35° 0' 1.2	63° 65' 0.06	58° 9' 0.2	31° 81' 0.20	68° 4' 2.2
30	44° 79' 0.11	36° 2' 1.0	63° 59' 0.10	59° 1' 0.2	31° 61' 0.25	70° 6' 1.8
Aug. 9	44° 68' 0.14	37° 2' 0.8	63° 49' 0.13	59° 3' 0.2	31° 36' 0.28	72° 4' 1.4
19	44° 54' 0.17	38° 0' 0.6	63° 36' 0.16	59° 5' 0.1	31° 08' 0.31	73° 8' 1.0
29	44° 37' 0.18	38° 6' 0.2	63° 20' 0.18	59° 6' 0.0	30° 77' 0.34	74° 8' 0.4
Sept. 8	44° 19' 0.18	38° 8' 0.1	63° 02' 0.19	59° 6' 0.1	30° 43' 0.35	75° 2' 0.0
18	44° 01' 0.19	38° 7' 0.4	62° 83' 0.19	59° 5' 0.1	30° 08' 0.35	75° 2' 0.5
28	43° 82' 0.17	38° 3' 0.6	62° 64' 0.17	59° 4' 0.2	29° 73' 0.34	74° 7' 1.1
Oct. 8	43° 65' 0.15	37° 7' 1.0	62° 47' 0.15	59° 2' 0.3	29° 39' 0.31	73° 6' 1.6
18	43° 50' 0.12	36° 7' 1.3	62° 32' 0.11	58° 9' 0.2	29° 08' 0.28	72° 0' 2.0
28	43° 38' 0.08	35° 4' 1.5	62° 21' 0.08	58° 7' 0.3	28° 80' 0.23	70° 0' 2.5
Nov. 7	43° 30' 0.04	33° 9' 1.8	62° 13' 0.02	58° 4' 0.2	28° 57' 0.18	67° 5' 2.9
17	43° 26' 0.00	32° 1' 2.1	62° 11' 0.03	58° 2' 0.2	28° 39' 0.11	64° 6' 3.2
27	43° 26' 0.06	30° 0' 2.3	62° 14' 0.08	58° 0' 0.0	28° 28' 0.03	61° 4' 3.4
Dec. 7	43° 32' 0.12	27° 7' 2.6	62° 22' 0.15	58° 0' 0.0	28° 25' 0.04	58° 0' 4.0
17	43° 44' 0.15	25° 1' 2.4	62° 37' 0.19	58° 0' 0.2	28° 29' 0.11	54° 0' 3.7
27	43° 59' 0.20	22° 7' 2.5	62° 56' 0.23	58° 2' 0.3	28° 40' 0.17	50° 3' 3.6
37	43° 79' 0.20	20° 2' 2.5	62° 79' 0.23	58° 5' 0.3	28° 57' 0.17	46° 7' 3.6



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Ophiuchi.		$\mu$ Herculis.	
	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 17	<sup>o</sup> 12	<sup>h</sup> 17	<sup>o</sup> 27
Jan. 1	<sup>m</sup> 28 <sup>s</sup> 51.82 <sup>s</sup> 0.20	<sup>'</sup> 39 <sup>"</sup> 27.0 <sup>"</sup> 2.2	<sup>m</sup> 41 <sup>s</sup> 20.05 <sup>s</sup> 0.19	<sup>'</sup> 47 <sup>"</sup> 55.3 <sup>"</sup> 2.9
11	52.02 0.22	24.8 2.2	20.24 0.21	52.4 2.7
21	52.24 0.25	22.6 2.0	20.45 0.24	49.7 2.5
31	52.49 0.27	20.6 1.6	20.69 0.27	47.2 2.1
Feb. 10	52.76 0.29	19.0 1.4	20.96 0.29	45.1 1.7
20	53.05 0.29	17.6 1.0	21.25 0.30	43.4 1.2
Mar. 2	53.34 0.29	16.6 0.5	21.55 0.31	42.2 0.7
12	53.63 0.29	16.1 0.2	21.86 0.31	41.5 0.1
22	53.92 0.28	15.9 0.3	22.17 0.30	41.4 0.4
Apr. 1	54.20 0.27	16.2 0.7	22.47 0.29	41.8 0.9
11	54.47 0.26	16.9 1.0	22.76 0.27	42.7 1.4
21	54.73 0.24	17.9 1.3	23.03 0.25	44.1 1.7
May 1	54.97 0.21	19.2 1.6	23.28 0.23	45.8 2.1
11	55.18 0.18	20.8 1.7	23.51 0.19	47.9 2.3
21	55.36 0.16	22.5 1.8	23.70 0.16	50.2 2.4
31	55.52 0.12	24.3 1.9	23.86 0.13	52.6 2.5
June 10	55.64 0.09	26.2 1.9	23.99 0.09	55.1 2.6
20	55.73 0.05	28.1 1.7	24.08 0.04	47 57.7 2.4
30	55.78 0.02	29.8 1.7	24.12 0.00	48 0.1 2.3
July 10	55.80 0.03	31.5 1.5	24.12 0.04	2.4 2.1
20	55.77 0.07	33.0 1.3	24.08 0.08	4.5 1.8
30	55.70 0.10	34.3 1.0	24.00 0.12	6.3 1.6
Aug. 9	55.60 0.13	35.3 0.9	23.88 0.16	7.9 1.2
19	55.47 0.16	36.2 0.6	23.72 0.18	9.1 0.9
29	55.31 0.17	36.8 0.3	23.54 0.20	10.0 0.5
Sept. 8	55.14 0.18	37.1 0.0	23.34 0.22	10.5 0.1
18	54.96 0.19	37.1 0.3	23.12 0.22	10.6 0.3
28	54.77 0.18	36.8 0.5	22.90 0.21	10.3 0.7
Oct. 8	54.59 0.15	36.3 0.8	22.69 0.20	9.6 1.1
18	54.44 0.13	35.5 1.2	22.49 0.17	8.5 1.4
28	54.31 0.10	34.3 1.4	22.32 0.13	7.1 1.8
Nov. 7	54.21 0.05	32.9 1.6	22.19 0.09	5.3 2.2
17	54.16 0.01	31.3 1.9	22.10 0.05	3.1 2.5
27	54.15 0.04	29.4 2.1	22.05 0.01	48 0.6 2.7
Dec. 7	54.19 0.09	27.3 2.4	22.06 0.05	47 57.9 2.9
17	54.28 0.14	24.9 2.4	{m:n} 0.11	{m:n} 3.0
27	54.42 0.18	22.5 2.3	22.23 0.16	51.7 3.0
37	28 54.60	39 20.2	41 22.39	47 48.7



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\gamma$ Draconis.			$\sigma$ Octantis.		
	R. A.		Dec. North.	R. A.		Dec. South.
	<sup>h</sup> 17		<sup>o</sup> 51	<sup>h</sup> 18		<sup>o</sup> 89
Jan. 1	<sup>m</sup> 53 <sup>s</sup> 32.74	<sup>s</sup> 0.17	<sup>'</sup> 30 <sup>"</sup> 18.7	<sup>m</sup> 4 <sup>s</sup> 5.89	<sup>s</sup> 8.75	<sup>'</sup> 16 <sup>"</sup> 34.0
11	32.91	0.23	15.2	14.64	11.69	31.0
21	33.14	0.28	11.9	26.33	14.29	28.2
31	33.42	0.32	8.9	40.62	16.45	25.8
Feb. 10	33.74	0.36	6.3	4 57.07	18.17	23.7
20	34.10	0.39	4.2	5 15.24	19.42	22.1
Mar. 2	34.49	0.40	2.8	34.66	20.20	21.0
12	34.89	0.40	1.9	5 54.86	20.54	20.3
Apr. 22	35.29	0.40	1.7	6 15.40	20.40	20.2
1	35.69	0.38	2.2	35.80	19.86	20.5
11	36.07	0.35	3.3	6 55.66	18.86	21.3
21	36.42	0.32	4.9	7 14.52	17.52	22.6
May 1	36.74	0.29	7.0	32.04	15.78	24.3
11	37.03	0.24	9.6	7 47.82	13.73	26.4
21	37.27	0.19	12.5	8 1.55	11.37	28.7
31	37.46	0.13	15.5	12.92	8.77	31.4
June 10	37.59	0.07	18.7	21.69	5.95	34.4
20	37.66	0.01	21.9	27.64	3.01	37.5
30	37.67	0.04	25.1	30.65	0.00	40.6
July 10	37.63	0.11	28.1	30.65	3.03	43.8
20	37.52	0.16	30.8	27.62	5.94	46.9
30	37.36	0.21	33.2	21.68	8.69	49.8
Aug. 9	37.15	0.26	35.3	12.99	11.13	52.4
19	36.89	0.30	37.0	8 1.86	13.23	54.6
Sept. 29	36.59	0.32	38.3	7 48.63	14.85	56.4
8	36.27	0.34	39.1	33.78	15.93	57.7
18	35.93	0.35	39.4	17.85	16.45	58.5
28	35.58	0.34	39.2	7 1.40	16.29	58.7
Oct. 8	35.24	0.33	38.5	6 45.11	15.50	58.2
18	34.91	0.29	37.3	29.61	14.08	57.2
28	34.62	0.25	35.6	15.53	12.07	55.6
Nov. 7	34.37	0.20	33.4	6 3.46	9.54	53.5
17	34.17	0.14	30.8	5 53.92	6.60	50.9
27	34.03	0.08	27.8	47.32	3.36	48.0
Dec. 7	33.95	0.00	24.5	43.96	0.01	44.9
17	33.95	0.07	21.0	43.97	3.99	41.7
27	34.02	0.14	17.1	47.96	7.12	38.1
37	34.16	0.14	13.5	5 55.08	16 35.0	35.0



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\mu$ Sagittarii.			$\alpha$ Lyrae (Vega)			$\beta$ Lyrae.		
	R. A.	Dec. South.		R. A.	Dec. North.		R. A.	Dec. North.	
	<sup>h</sup> 18	<sup>m</sup> 5	<sup>o</sup> 21	<sup>h</sup> 18	<sup>m</sup> 32	<sup>o</sup> 38	<sup>h</sup> 18	<sup>m</sup> 45	<sup>o</sup> 33
Jan. 1	56 <sup>s</sup> .76	0 <sup>s</sup> .19	20 <sup>s</sup> .3	29 <sup>s</sup> .88	0 <sup>s</sup> .11	53 <sup>s</sup> .4	14 <sup>s</sup> .50	0 <sup>s</sup> .10	49 <sup>s</sup> .5
11	56 <sup>s</sup> .95	0 <sup>s</sup> .22	20 <sup>s</sup> .6	29 <sup>s</sup> .99	0 <sup>s</sup> .17	50 <sup>s</sup> .2	14 <sup>s</sup> .60	0 <sup>s</sup> .15	46 <sup>s</sup> .5
21	57 <sup>s</sup> .17	0 <sup>s</sup> .25	20 <sup>s</sup> .9	30 <sup>s</sup> .16	0 <sup>s</sup> .21	47 <sup>s</sup> .1	14 <sup>s</sup> .75	0 <sup>s</sup> .19	43 <sup>s</sup> .6
31	57 <sup>s</sup> .42	0 <sup>s</sup> .28	21 <sup>s</sup> .3	30 <sup>s</sup> .37	0 <sup>s</sup> .24	44 <sup>s</sup> .2	14 <sup>s</sup> .94	0 <sup>s</sup> .23	40 <sup>s</sup> .8
Feb. 10	57 <sup>s</sup> .70	0 <sup>s</sup> .29	21 <sup>s</sup> .6	30 <sup>s</sup> .61	0 <sup>s</sup> .28	41 <sup>s</sup> .6	15 <sup>s</sup> .17	0 <sup>s</sup> .25	38 <sup>s</sup> .3
20	57 <sup>s</sup> .99	0 <sup>s</sup> .31	21 <sup>s</sup> .9	30 <sup>s</sup> .89	0 <sup>s</sup> .31	39 <sup>s</sup> .5	15 <sup>s</sup> .42	0 <sup>s</sup> .28	36 <sup>s</sup> .3
Mar. 2	58 <sup>s</sup> .30	0 <sup>s</sup> .31	22 <sup>s</sup> .1	31 <sup>s</sup> .20	0 <sup>s</sup> .32	37 <sup>s</sup> .9	15 <sup>s</sup> .70	0 <sup>s</sup> .30	34 <sup>s</sup> .7
12	58 <sup>s</sup> .61	0 <sup>s</sup> .31	22 <sup>s</sup> .3	31 <sup>s</sup> .52	0 <sup>s</sup> .33	36 <sup>s</sup> .8	16 <sup>s</sup> .00	0 <sup>s</sup> .31	33 <sup>s</sup> .6
22	58 <sup>s</sup> .92	0 <sup>s</sup> .32	22 <sup>s</sup> .3	31 <sup>s</sup> .85	0 <sup>s</sup> .33	36 <sup>s</sup> .3	16 <sup>s</sup> .31	0 <sup>s</sup> .32	33 <sup>s</sup> .1
Apr. 1	59 <sup>s</sup> .24	0 <sup>s</sup> .30	22 <sup>s</sup> .3	32 <sup>s</sup> .18	0 <sup>s</sup> .33	36 <sup>s</sup> .4	16 <sup>s</sup> .63	0 <sup>s</sup> .32	33 <sup>s</sup> .1
11	59 <sup>s</sup> .54	0 <sup>s</sup> .30	22 <sup>s</sup> .2	32 <sup>s</sup> .51	0 <sup>s</sup> .33	37 <sup>s</sup> .1	16 <sup>s</sup> .95	0 <sup>s</sup> .31	33 <sup>s</sup> .7
21	59 <sup>s</sup> .84	0 <sup>s</sup> .29	22 <sup>s</sup> .1	32 <sup>s</sup> .84	0 <sup>s</sup> .31	38 <sup>s</sup> .4	17 <sup>s</sup> .26	0 <sup>s</sup> .30	34 <sup>s</sup> .8
May 1	60 <sup>s</sup> .13	0 <sup>s</sup> .27	21 <sup>s</sup> .8	33 <sup>s</sup> .15	0 <sup>s</sup> .28	40 <sup>s</sup> .1	17 <sup>s</sup> .56	0 <sup>s</sup> .28	36 <sup>s</sup> .4
11	60 <sup>s</sup> .40	0 <sup>s</sup> .24	21 <sup>s</sup> .6	33 <sup>s</sup> .43	0 <sup>s</sup> .25	42 <sup>s</sup> .3	17 <sup>s</sup> .84	0 <sup>s</sup> .26	38 <sup>s</sup> .4
21	60 <sup>s</sup> .64	0 <sup>s</sup> .22	21 <sup>s</sup> .3	33 <sup>s</sup> .68	0 <sup>s</sup> .22	44 <sup>s</sup> .8	18 <sup>s</sup> .10	0 <sup>s</sup> .22	40 <sup>s</sup> .7
31	60 <sup>s</sup> .86	0 <sup>s</sup> .19	21 <sup>s</sup> .1	33 <sup>s</sup> .90	0 <sup>s</sup> .18	47 <sup>s</sup> .5	18 <sup>s</sup> .32	0 <sup>s</sup> .19	43 <sup>s</sup> .3
June 10	61 <sup>s</sup> .05	0 <sup>s</sup> .16	20 <sup>s</sup> .9	34 <sup>s</sup> .08	0 <sup>s</sup> .13	50 <sup>s</sup> .4	18 <sup>s</sup> .51	0 <sup>s</sup> .15	46 <sup>s</sup> .1
20	61 <sup>s</sup> .21	0 <sup>s</sup> .11	20 <sup>s</sup> .8	34 <sup>s</sup> .21	0 <sup>s</sup> .09	53 <sup>s</sup> .4	18 <sup>s</sup> .66	0 <sup>s</sup> .10	48 <sup>s</sup> .9
30	61 <sup>s</sup> .32	0 <sup>s</sup> .07	20 <sup>s</sup> .8	34 <sup>s</sup> .30	0 <sup>s</sup> .03	56 <sup>s</sup> .4	18 <sup>s</sup> .76	0 <sup>s</sup> .06	51 <sup>s</sup> .8
July 10	61 <sup>s</sup> .39	0 <sup>s</sup> .02	20 <sup>s</sup> .8	34 <sup>s</sup> .33	0 <sup>s</sup> .01	59 <sup>s</sup> .3	18 <sup>s</sup> .82	0 <sup>s</sup> .01	54 <sup>s</sup> .6
20	61 <sup>s</sup> .41	0 <sup>s</sup> .02	20 <sup>s</sup> .8	34 <sup>s</sup> .32	0 <sup>s</sup> .07	62 <sup>s</sup> .1	18 <sup>s</sup> .83	0 <sup>s</sup> .04	57 <sup>s</sup> .2
30	61 <sup>s</sup> .39	0 <sup>s</sup> .06	21 <sup>s</sup> .0	34 <sup>s</sup> .25	0 <sup>s</sup> .11	64 <sup>s</sup> .6	18 <sup>s</sup> .79	0 <sup>s</sup> .08	59 <sup>s</sup> .6
Aug. 9	61 <sup>s</sup> .33	0 <sup>s</sup> .10	21 <sup>s</sup> .2	34 <sup>s</sup> .14	0 <sup>s</sup> .16	66 <sup>s</sup> .8	18 <sup>s</sup> .71	0 <sup>s</sup> .13	61 <sup>s</sup> .8
19	61 <sup>s</sup> .23	0 <sup>s</sup> .13	21 <sup>s</sup> .4	33 <sup>s</sup> .98	0 <sup>s</sup> .19	68 <sup>s</sup> .7	18 <sup>s</sup> .58	0 <sup>s</sup> .16	63 <sup>s</sup> .7
29	61 <sup>s</sup> .10	0 <sup>s</sup> .16	21 <sup>s</sup> .5	33 <sup>s</sup> .79	0 <sup>s</sup> .22	70 <sup>s</sup> .3	18 <sup>s</sup> .42	0 <sup>s</sup> .20	65 <sup>s</sup> .2
Sept. 8	60 <sup>s</sup> .94	0 <sup>s</sup> .18	21 <sup>s</sup> .7	33 <sup>s</sup> .57	0 <sup>s</sup> .25	71 <sup>s</sup> .5	18 <sup>s</sup> .22	0 <sup>s</sup> .22	66 <sup>s</sup> .3
18	60 <sup>s</sup> .76	0 <sup>s</sup> .18	21 <sup>s</sup> .9	33 <sup>s</sup> .32	0 <sup>s</sup> .26	72 <sup>s</sup> .2	18 <sup>s</sup> .00	0 <sup>s</sup> .24	67 <sup>s</sup> .1
28	60 <sup>s</sup> .58	0 <sup>s</sup> .18	22 <sup>s</sup> .0	33 <sup>s</sup> .06	0 <sup>s</sup> .26	72 <sup>s</sup> .4	17 <sup>s</sup> .76	0 <sup>s</sup> .23	67 <sup>s</sup> .4
Oct. 8	60 <sup>s</sup> .40	0 <sup>s</sup> .17	22 <sup>s</sup> .0	32 <sup>s</sup> .80	0 <sup>s</sup> .25	72 <sup>s</sup> .2	17 <sup>s</sup> .53	0 <sup>s</sup> .23	67 <sup>s</sup> .3
18	60 <sup>s</sup> .23	0 <sup>s</sup> .14	22 <sup>s</sup> .0	32 <sup>s</sup> .55	0 <sup>s</sup> .23	71 <sup>s</sup> .6	17 <sup>s</sup> .30	0 <sup>s</sup> .22	66 <sup>s</sup> .8
28	60 <sup>s</sup> .09	0 <sup>s</sup> .11	22 <sup>s</sup> .1	32 <sup>s</sup> .32	0 <sup>s</sup> .21	70 <sup>s</sup> .4	17 <sup>s</sup> .08	0 <sup>s</sup> .19	65 <sup>s</sup> .8
Nov. 7	59 <sup>s</sup> .98	0 <sup>s</sup> .07	22 <sup>s</sup> .1	32 <sup>s</sup> .11	0 <sup>s</sup> .17	68 <sup>s</sup> .8	16 <sup>s</sup> .89	0 <sup>s</sup> .15	64 <sup>s</sup> .4
17	59 <sup>s</sup> .91	0 <sup>s</sup> .02	22 <sup>s</sup> .1	31 <sup>s</sup> .94	0 <sup>s</sup> .12	66 <sup>s</sup> .8	16 <sup>s</sup> .74	0 <sup>s</sup> .12	62 <sup>s</sup> .6
27	59 <sup>s</sup> .89	0 <sup>s</sup> .03	22 <sup>s</sup> .1	31 <sup>s</sup> .82	0 <sup>s</sup> .07	64 <sup>s</sup> .4	16 <sup>s</sup> .62	0 <sup>s</sup> .07	60 <sup>s</sup> .4
Dec. 7	59 <sup>s</sup> .92	0 <sup>s</sup> .07	22 <sup>s</sup> .2	31 <sup>s</sup> .75	0 <sup>s</sup> .02	61 <sup>s</sup> .7	16 <sup>s</sup> .55	0 <sup>s</sup> .02	57 <sup>s</sup> .9
17	59 <sup>s</sup> .99	0 <sup>s</sup> .14	22 <sup>s</sup> .4	31 <sup>s</sup> .73	0 <sup>s</sup> .04	58 <sup>s</sup> .7	16 <sup>s</sup> .53	0 <sup>s</sup> .03	55 <sup>s</sup> .2
27	60 <sup>s</sup> .13	0 <sup>s</sup> .17	22 <sup>s</sup> .6	31 <sup>s</sup> .77	0 <sup>s</sup> .09	55 <sup>s</sup> .5	16 <sup>s</sup> .56	0 <sup>s</sup> .09	52 <sup>s</sup> .3
37	60 <sup>s</sup> .30	0 <sup>s</sup> .17	22 <sup>s</sup> .9	31 <sup>s</sup> .86	0 <sup>s</sup> .15	52 <sup>s</sup> .0	16 <sup>s</sup> .65	0 <sup>s</sup> .09	48 <sup>s</sup> .9



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ζ Aquilæ.		ω Aquilæ.		δ Aquilæ.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 18 <sup>m</sup> 59	<sup>°</sup> 13 <sup>'</sup> 40	<sup>h</sup> 19 <sup>m</sup> 11	<sup>°</sup> 11 <sup>'</sup> 21	<sup>h</sup> 19 <sup>m</sup> 18	<sup>°</sup> 2 <sup>'</sup> 51
Jan. 1	23.74 <sup>s</sup> 0.11	22.7 <sup>"</sup> 2.3	40.62 <sup>s</sup> 0.11	48.2 <sup>"</sup> 2.2	54.31 <sup>s</sup> 0.10	29.3 <sup>"</sup> 1.6
11	23.85 <sup>s</sup> 0.14	20.4 <sup>"</sup> 2.1	40.73 <sup>s</sup> 0.13	46.0 <sup>"</sup> 2.0	54.41 <sup>s</sup> 0.13	27.7 <sup>"</sup> 1.5
21	23.99 <sup>s</sup> 0.18	18.3 <sup>"</sup> 2.0	40.86 <sup>s</sup> 0.16	44.0 <sup>"</sup> 1.8	54.54 <sup>s</sup> 0.17	26.2 <sup>"</sup> 1.3
31	24.17 <sup>s</sup> 0.20	16.3 <sup>"</sup> 1.7	41.02 <sup>s</sup> 0.20	42.2 <sup>"</sup> 1.6	54.71 <sup>s</sup> 0.19	24.9 <sup>"</sup> 1.2
Feb. 10	24.37 <sup>s</sup> 0.23	14.6 <sup>"</sup> 1.5	41.22 <sup>s</sup> 0.22	40.6 <sup>"</sup> 1.4	54.90 <sup>s</sup> 0.22	23.7 <sup>"</sup> 1.0
20	24.60 <sup>s</sup> 0.25	13.1 <sup>"</sup> 1.1	41.44 <sup>s</sup> 0.24	39.2 <sup>"</sup> 1.0	55.12 <sup>s</sup> 0.23	22.7 <sup>"</sup> 0.7
Mar. 2	24.85 <sup>s</sup> 0.27	12.0 <sup>"</sup> 0.7	41.68 <sup>s</sup> 0.26	38.2 <sup>"</sup> 0.7	55.35 <sup>s</sup> 0.26	22.0 <sup>"</sup> 0.4
12	25.12 <sup>s</sup> 0.28	11.3 <sup>"</sup> 0.3	41.94 <sup>s</sup> 0.27	37.5 <sup>"</sup> 0.3	55.61 <sup>s</sup> 0.27	21.6 <sup>"</sup> 0.1
Apr. 22	25.40 <sup>s</sup> 0.29	11.0 <sup>"</sup> 0.1	42.21 <sup>s</sup> 0.29	37.2 <sup>"</sup> 0.1	55.88 <sup>s</sup> 0.28	21.5 <sup>"</sup> 0.2
1	25.69 <sup>s</sup> 0.29	11.1 <sup>"</sup> 0.5	42.50 <sup>s</sup> 0.29	37.3 <sup>"</sup> 0.5	56.16 <sup>s</sup> 0.29	21.7 <sup>"</sup> 0.6
11	25.98 <sup>s</sup> 0.28	11.6 <sup>"</sup> 0.9	42.79 <sup>s</sup> 0.29	37.8 <sup>"</sup> 0.9	56.45 <sup>s</sup> 0.29	22.3 <sup>"</sup> 0.8
21	26.26 <sup>s</sup> 0.29	12.5 <sup>"</sup> 1.3	43.08 <sup>s</sup> 0.28	38.7 <sup>"</sup> 1.3	56.74 <sup>s</sup> 0.29	23.1 <sup>"</sup> 1.1
May 1	26.55 <sup>s</sup> 0.27	13.8 <sup>"</sup> 1.6	43.36 <sup>s</sup> 0.28	40.0 <sup>"</sup> 1.5	57.03 <sup>s</sup> 0.28	24.2 <sup>"</sup> 1.4
11	26.82 <sup>s</sup> 0.25	15.4 <sup>"</sup> 1.8	43.64 <sup>s</sup> 0.26	41.5 <sup>"</sup> 1.8	57.31 <sup>s</sup> 0.27	25.6 <sup>"</sup> 1.5
21	27.07 <sup>s</sup> 0.23	17.2 <sup>"</sup> 2.0	43.90 <sup>s</sup> 0.24	43.3 <sup>"</sup> 1.9	57.58 <sup>s</sup> 0.25	27.1 <sup>"</sup> 1.6
31	27.30 <sup>s</sup> 0.21	19.2 <sup>"</sup> 2.1	44.14 <sup>s</sup> 0.22	45.2 <sup>"</sup> 2.0	57.83 <sup>s</sup> 0.22	28.7 <sup>"</sup> 1.7
June 10	27.51 <sup>s</sup> 0.17	21.3 <sup>"</sup> 2.1	44.36 <sup>s</sup> 0.18	47.2 <sup>"</sup> 2.0	58.05 <sup>s</sup> 0.20	30.4 <sup>"</sup> 1.6
20	27.68 <sup>s</sup> 0.13	23.4 <sup>"</sup> 2.1	44.54 <sup>s</sup> 0.14	49.2 <sup>"</sup> 2.0	58.25 <sup>s</sup> 0.16	32.0 <sup>"</sup> 1.7
30	27.81 <sup>s</sup> 0.09	25.5 <sup>"</sup> 2.0	44.68 <sup>s</sup> 0.11	51.2 <sup>"</sup> 2.0	58.41 <sup>s</sup> 0.12	33.7 <sup>"</sup> 1.5
July 10	27.90 <sup>s</sup> 0.05	27.5 <sup>"</sup> 1.9	44.79 <sup>s</sup> 0.06	53.2 <sup>"</sup> 1.8	58.53 <sup>s</sup> 0.07	35.2 <sup>"</sup> 1.4
20	27.95 <sup>s</sup> 0.00	29.4 <sup>"</sup> 1.8	44.85 <sup>s</sup> 0.02	55.0 <sup>"</sup> 1.7	58.60 <sup>s</sup> 0.04	36.6 <sup>"</sup> 1.3
30	27.95 <sup>s</sup> 0.03	31.2 <sup>"</sup> 1.5	44.87 <sup>s</sup> 0.03	56.7 <sup>"</sup> 1.5	58.64 <sup>s</sup> 0.01	37.9 <sup>"</sup> 1.1
Aug. 9	27.92 <sup>s</sup> 0.08	32.7 <sup>"</sup> 1.3	44.84 <sup>s</sup> 0.06	58.2 <sup>"</sup> 1.2	58.63 <sup>s</sup> 0.05	39.0 <sup>"</sup> 0.9
19	27.84 <sup>s</sup> 0.11	34.0 <sup>"</sup> 1.0	44.78 <sup>s</sup> 0.10	59.4 <sup>"</sup> 1.0	58.58 <sup>s</sup> 0.10	39.9 <sup>"</sup> 0.7
Sept. 29	27.73 <sup>s</sup> 0.15	35.0 <sup>"</sup> 0.8	44.68 <sup>s</sup> 0.14	60.4 <sup>"</sup> 0.8	58.48 <sup>s</sup> 0.12	40.6 <sup>"</sup> 0.5
8	27.58 <sup>s</sup> 0.17	35.8 <sup>"</sup> 0.5	44.54 <sup>s</sup> 0.16	61.2 <sup>"</sup> 0.5	58.36 <sup>s</sup> 0.15	41.1 <sup>"</sup> 0.3
18	27.41 <sup>s</sup> 0.18	36.3 <sup>"</sup> 0.2	44.38 <sup>s</sup> 0.17	61.7 <sup>"</sup> 0.2	58.21 <sup>s</sup> 0.16	41.4 <sup>"</sup> 0.1
28	27.23 <sup>s</sup> 0.19	36.5 <sup>"</sup> 0.1	44.21 <sup>s</sup> 0.19	61.9 <sup>"</sup> 0.0	58.05 <sup>s</sup> 0.17	41.5 <sup>"</sup> 0.1
Oct. 8	27.04 <sup>s</sup> 0.18	36.4 <sup>"</sup> 0.4	44.02 <sup>s</sup> 0.18	61.9 <sup>"</sup> 0.4	57.88 <sup>s</sup> 0.18	41.4 <sup>"</sup> 0.3
18	26.86 <sup>s</sup> 0.17	36.0 <sup>"</sup> 0.7	43.84 <sup>s</sup> 0.17	61.5 <sup>"</sup> 0.9	57.70 <sup>s</sup> 0.16	41.1 <sup>"</sup> 0.6
28	26.69 <sup>s</sup> 0.15	35.3 <sup>"</sup> 0.9	43.67 <sup>s</sup> 0.15	60.9 <sup>"</sup> 0.9	57.54 <sup>s</sup> 0.14	40.5 <sup>"</sup> 0.7
Nov. 7	26.54 <sup>s</sup> 0.12	34.4 <sup>"</sup> 1.3	43.52 <sup>s</sup> 0.12	60.0 <sup>"</sup> 1.1	57.40 <sup>s</sup> 0.12	39.8 <sup>"</sup> 0.8
17	26.42 <sup>s</sup> 0.08	33.1 <sup>"</sup> 1.5	43.40 <sup>s</sup> 0.09	58.9 <sup>"</sup> 1.3	57.28 <sup>s</sup> 0.08	39.0 <sup>"</sup> 1.1
27	26.34 <sup>s</sup> 0.04	31.6 <sup>"</sup> 1.8	43.31 <sup>s</sup> 0.05	57.6 <sup>"</sup> 1.8	57.20 <sup>s</sup> 0.04	37.9 <sup>"</sup> 1.2
Dec. 7	26.30 <sup>s</sup> 0.00	29.8 <sup>"</sup> 1.9	43.26 <sup>s</sup> 0.03	56.0 <sup>"</sup> 1.9	57.16 <sup>s</sup> 0.01	36.7 <sup>"</sup> 1.4
17	26.30 <sup>s</sup> 0.04	27.9 <sup>"</sup> 2.0	43.26 <sup>s</sup> 0.03	54.2 <sup>"</sup> 1.9	57.15 <sup>s</sup> 0.04	35.3 <sup>"</sup> 1.4
27	26.34 <sup>s</sup> 0.09	25.9 <sup>"</sup> 2.4	43.29 <sup>s</sup> 0.07	52.3 <sup>"</sup> 2.0	57.19 <sup>s</sup> 0.07	33.9 <sup>"</sup> 1.4
37	26.43 <sup>s</sup> 0.09	23.5 <sup>"</sup> 2.4	43.26 <sup>s</sup> 0.07	50.3 <sup>"</sup> 2.0	57.26 <sup>s</sup> 0.07	32.5 <sup>"</sup> 1.4



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Sagittarii.		$\gamma$ Aquilæ.		$\alpha$ Aquilæ. ( <i>Altair</i> )	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 19 <sup>m</sup> 28	<sup>°</sup> 25 <sup>'</sup> 9	<sup>h</sup> 19 <sup>m</sup> 40	<sup>°</sup> 10 <sup>'</sup> 17	<sup>h</sup> 19 <sup>m</sup> 44	<sup>°</sup> 8 <sup>'</sup> 31
Jan. 1	44° 88' 0" 11	63° 7' 0" 11	2° 52' 0" 07	55° 7' 0" 18	24° 21' 0" 06	38° 3' 0" 17
11	44° 99' 0" 15	63° 4' 0" 13	2° 59' 0" 11	53° 9' 0" 11	24° 27' 0" 06	36° 6' 0" 17
21	45° 14' 0" 19	63° 1' 0" 13	2° 70' 0" 14	51° 8' 0" 17	24° 38' 0" 14	34° 7' 0" 16
31	45° 33' 0" 21	62° 8' 0" 14	2° 84' 0" 17	50° 1' 0" 15	24° 52' 0" 17	33° 1' 0" 14
Feb. 10	45° 54' 0" 24	62° 4' 0" 14	3° 01' 0" 19	48° 6' 0" 13	24° 69' 0" 19	31° 7' 0" 12
20	45° 78' 0" 27	62° 0' 0" 15	3° 20' 0" 22	47° 3' 0" 10	24° 88' 0" 22	30° 5' 0" 10
Mar. 2	46° 05' 0" 28	61° 5' 0" 16	3° 42' 0" 25	46° 3' 0" 07	25° 10' 0" 24	29° 5' 0" 06
12	46° 33' 0" 30	60° 9' 0" 16	3° 67' 0" 26	45° 6' 0" 03	25° 34' 0" 26	28° 9' 0" 02
22	46° 63' 0" 32	60° 3' 0" 16	3° 93' 0" 28	45° 3' 0" 01	25° 60' 0" 28	28° 7' 0" 02
Apr. 1	46° 95' 0" 32	59° 7' 0" 17	4° 21' 0" 28	45° 4' 0" 05	25° 88' 0" 28	28° 9' 0" 05
11	47° 27' 0" 33	59° 0' 0" 18	4° 49' 0" 29	45° 9' 0" 09	26° 16' 0" 29	29° 4' 0" 08
21	47° 60' 0" 32	58° 2' 0" 17	4° 78' 0" 30	46° 8' 0" 12	26° 45' 0" 30	30° 2' 0" 12
May 1	47° 92' 0" 32	57° 5' 0" 16	5° 08' 0" 28	48° 0' 0" 15	26° 75' 0" 29	31° 4' 0" 15
11	48° 24' 0" 31	56° 9' 0" 17	5° 36' 0" 28	49° 5' 0" 17	27° 04' 0" 28	32° 9' 0" 17
21	48° 55' 0" 29	56° 2' 0" 15	5° 64' 0" 26	51° 2' 0" 19	27° 32' 0" 26	34° 6' 0" 19
31	48° 84' 0" 27	55° 7' 0" 14	5° 90' 0" 24	53° 1' 0" 20	27° 58' 0" 24	36° 5' 0" 19
June 10	49° 11' 0" 23	55° 3' 0" 12	6° 14' 0" 20	55° 1' 0" 20	27° 82' 0" 21	38° 4' 0" 20
20	49° 34' 0" 20	55° 1' 0" 11	6° 34' 0" 17	57° 1' 0" 21	28° 03' 0" 18	40° 4' 0" 20
30	49° 54' 0" 16	55° 0' 0" 10	6° 51' 0" 14	59° 2' 0" 20	28° 21' 0" 14	42° 4' 0" 19
July 10	49° 70' 0" 10	55° 0' 0" 01	6° 65' 0" 09	61° 2' 0" 18	28° 35' 0" 09	44° 3' 0" 18
20	49° 80' 0" 06	55° 1' 0" 03	6° 74' 0" 04	63° 0' 0" 17	28° 44' 0" 05	46° 1' 0" 17
30	49° 86' 0" 02	55° 4' 0" 04	6° 78' 0" 00	64° 7' 0" 16	28° 49' 0" 01	47° 8' 0" 14
Aug. 9	49° 87' 0" 03	55° 8' 0" 05	6° 78' 0" 04	66° 3' 0" 13	28° 50' 0" 03	49° 2' 0" 13
19	49° 84' 0" 08	56° 3' 0" 06	6° 74' 0" 08	67° 6' 0" 11	28° 47' 0" 07	50° 5' 0" 10
29	49° 76' 0" 12	56° 9' 0" 05	6° 66' 0" 11	68° 7' 0" 08	28° 40' 0" 11	51° 5' 0" 08
Sept. 8	49° 64' 0" 15	57° 4' 0" 06	6° 55' 0" 14	69° 5' 0" 06	28° 29' 0" 14	52° 3' 0" 06
18	49° 49' 0" 17	58° 0' 0" 05	6° 41' 0" 17	70° 1' 0" 03	28° 15' 0" 16	52° 9' 0" 03
28	49° 32' 0" 19	58° 5' 0" 04	6° 24' 0" 18	70° 4' 0" 01	27° 99' 0" 17	53° 2' 0" 00
Oct. 8	49° 13' 0" 19	58° 9' 0" 04	6° 06' 0" 17	70° 5' 0" 02	27° 82' 0" 18	53° 2' 0" 02
18	48° 94' 0" 17	59° 3' 0" 02	5° 89' 0" 17	70° 3' 0" 05	27° 64' 0" 17	53° 0' 0" 04
28	48° 77' 0" 15	59° 5' 0" 01	5° 72' 0" 16	69° 8' 0" 07	27° 47' 0" 15	52° 6' 0" 07
Nov. 7	48° 62' 0" 12	59° 6' 0" 01	5° 56' 0" 13	69° 1' 0" 10	27° 32' 0" 13	51° 9' 0" 09
17	48° 50' 0" 09	59° 7' 0" 00	5° 43' 0" 10	68° 1' 0" 12	27° 19' 0" 10	51° 0' 0" 11
27	48° 41' 0" 05	59° 7' 0" 02	5° 33' 0" 07	66° 9' 0" 14	27° 09' 0" 07	49° 9' 0" 14
Dec. 7	48° 36' 0" 01	59° 5' 0" 01	5° 26' 0" 03	65° 5' 0" 16	27° 02' 0" 03	48° 5' 0" 15
17	48° 35' 0" 05	59° 4' 0" 02	5° 23' 0" 01	63° 9' 0" 18	26° 99' 0" 01	47° 0' 0" 16
27	48° 40' 0" 08	59° 2' 0" 02	5° 24' 0" 04	62° 1' 0" 18	27° 00' 0" 04	45° 4' 0" 17
37	48° 48' 0" 08	59° 0' 0" 02	5° 28' 0" 04	60° 3' 0" 18	27° 04' 0" 04	43° 7' 0" 17



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Aquilæ		$\lambda$ Ursæ Minoris	
	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 19	<sup>°</sup> 6	<sup>h</sup> 19	<sup>°</sup> 88
Jan. 1	48 <sup>m</sup> 53 <sup>s</sup> 40 <sup>s</sup> 0 <sup>s</sup> 07	5 3 <sup>1</sup> 1 <sup>6</sup>	53 <sup>m</sup> 35 <sup>s</sup> 16 <sup>s</sup> 4 <sup>s</sup> 59	55 <sup>1</sup> 12 <sup>4</sup> 3 <sup>2</sup>
11	53 <sup>48</sup> 47 0 <sup>10</sup>	5 1 <sup>5</sup> 1 <sup>7</sup>	30 <sup>53</sup> 57 4 <sup>41</sup>	9 <sup>2</sup> 3 <sup>6</sup>
21	53 <sup>48</sup> 57 0 <sup>13</sup>	4 59 <sup>8</sup> 1 <sup>5</sup>	28 <sup>53</sup> 16 0 <sup>23</sup>	5 <sup>6</sup> 3 <sup>4</sup>
31	53 <sup>48</sup> 70 0 <sup>17</sup>	58 <sup>3</sup> 1 <sup>3</sup>	28 <sup>53</sup> 39 2 <sup>52</sup>	55 <sup>48</sup> 2 <sup>2</sup> 3 <sup>2</sup>
Feb. 10	53 <sup>48</sup> 87 0 <sup>19</sup>	57 <sup>0</sup> 1 <sup>1</sup>	30 <sup>53</sup> 91 4 <sup>67</sup>	54 <sup>48</sup> 59 <sup>0</sup> 3 <sup>0</sup>
20	54 <sup>48</sup> 06 0 <sup>21</sup>	55 <sup>9</sup> 0 <sup>8</sup>	35 <sup>53</sup> 58 6 <sup>60</sup>	56 <sup>0</sup> 2 <sup>7</sup>
Mar. 2	54 <sup>48</sup> 27 0 <sup>24</sup>	55 <sup>1</sup> 0 <sup>5</sup>	42 <sup>53</sup> 18 8 <sup>26</sup>	53 <sup>3</sup> 2 <sup>3</sup>
12	54 <sup>48</sup> 51 0 <sup>26</sup>	54 <sup>6</sup> 0 <sup>2</sup>	50 <sup>53</sup> 44 9 <sup>52</sup>	51 <sup>0</sup> 1 <sup>7</sup>
22	54 <sup>48</sup> 77 0 <sup>27</sup>	54 <sup>4</sup> 0 <sup>1</sup>	53 <sup>53</sup> 59 <sup>96</sup> 10 <sup>42</sup>	49 <sup>3</sup> 1 <sup>1</sup>
Apr. 1	55 <sup>48</sup> 04 0 <sup>29</sup>	54 <sup>5</sup> 0 <sup>5</sup>	54 <sup>53</sup> 10 <sup>38</sup> 10 <sup>88</sup>	48 <sup>2</sup> 0 <sup>6</sup>
11	55 <sup>48</sup> 33 0 <sup>29</sup>	55 <sup>0</sup> 0 <sup>9</sup>	21 <sup>53</sup> 26 10 <sup>92</sup>	47 <sup>6</sup> 0 <sup>1</sup>
21	55 <sup>48</sup> 62 0 <sup>29</sup>	55 <sup>9</sup> 1 <sup>2</sup>	32 <sup>53</sup> 18 10 <sup>56</sup>	47 <sup>7</sup> 0 <sup>7</sup>
May 1	55 <sup>48</sup> 91 0 <sup>29</sup>	57 <sup>1</sup> 1 <sup>4</sup>	42 <sup>53</sup> 74 9 <sup>82</sup>	48 <sup>4</sup> 1 <sup>2</sup>
11	56 <sup>48</sup> 20 0 <sup>28</sup>	4 58 <sup>5</sup> 1 <sup>6</sup>	54 <sup>53</sup> 52 <sup>56</sup> 8 <sup>74</sup>	49 <sup>6</sup> 1 <sup>8</sup>
21	56 <sup>48</sup> 48 0 <sup>27</sup>	5 0 <sup>1</sup> 1 <sup>7</sup>	55 <sup>53</sup> 1 <sup>30</sup> 7 <sup>40</sup>	51 <sup>4</sup> 2 <sup>2</sup>
31	56 <sup>48</sup> 75 0 <sup>24</sup>	1 <sup>8</sup> 1 <sup>9</sup>	8 <sup>53</sup> 70 5 <sup>82</sup>	53 <sup>6</sup> 2 <sup>6</sup>
June 10	56 <sup>48</sup> 99 0 <sup>22</sup>	3 <sup>7</sup> 1 <sup>9</sup>	14 <sup>53</sup> 52 4 <sup>08</sup>	56 <sup>2</sup> 2 <sup>9</sup>
20	57 <sup>48</sup> 21 0 <sup>18</sup>	5 <sup>6</sup> 1 <sup>8</sup>	18 <sup>53</sup> 60 2 <sup>21</sup>	54 <sup>48</sup> 59 <sup>1</sup> 3 <sup>1</sup>
30	57 <sup>48</sup> 39 0 <sup>14</sup>	7 <sup>4</sup> 1 <sup>8</sup>	20 <sup>53</sup> 81 0 <sup>34</sup>	55 <sup>48</sup> 2 <sup>2</sup> 3 <sup>2</sup>
July 10	57 <sup>48</sup> 53 0 <sup>10</sup>	9 <sup>2</sup> 1 <sup>6</sup>	21 <sup>53</sup> 15 1 <sup>57</sup>	5 <sup>4</sup> 3 <sup>3</sup>
20	57 <sup>48</sup> 63 0 <sup>06</sup>	10 <sup>8</sup> 1 <sup>5</sup>	19 <sup>53</sup> 58 3 <sup>52</sup>	8 <sup>7</sup> 3 <sup>3</sup>
30	57 <sup>48</sup> 69 0 <sup>01</sup>	12 <sup>3</sup> 1 <sup>4</sup>	16 <sup>53</sup> 06 5 <sup>29</sup>	12 <sup>0</sup> 3 <sup>2</sup>
Aug. 9	57 <sup>48</sup> 70 0 <sup>03</sup>	13 <sup>7</sup> 1 <sup>1</sup>	10 <sup>53</sup> 77 6 <sup>98</sup>	15 <sup>2</sup> 3 <sup>0</sup>
19	57 <sup>48</sup> 67 0 <sup>07</sup>	14 <sup>8</sup> 0 <sup>9</sup>	55 <sup>53</sup> 3 <sup>79</sup> 8 <sup>55</sup>	18 <sup>2</sup> 2 <sup>8</sup>
29	57 <sup>48</sup> 60 0 <sup>11</sup>	15 <sup>7</sup> 0 <sup>7</sup>	54 <sup>53</sup> 55 <sup>24</sup> 9 <sup>93</sup>	21 <sup>0</sup> 2 <sup>5</sup>
Sept. 8	57 <sup>48</sup> 49 0 <sup>13</sup>	16 <sup>4</sup> 0 <sup>5</sup>	45 <sup>53</sup> 31 11 <sup>12</sup>	23 <sup>5</sup> 2 <sup>1</sup>
18	57 <sup>48</sup> 36 0 <sup>15</sup>	16 <sup>9</sup> 0 <sup>2</sup>	34 <sup>53</sup> 19 12 <sup>10</sup>	25 <sup>6</sup> 1 <sup>7</sup>
28	57 <sup>48</sup> 21 0 <sup>17</sup>	17 <sup>1</sup> 0 <sup>0</sup>	22 <sup>53</sup> 09 12 <sup>84</sup>	27 <sup>3</sup> 1 <sup>3</sup>
Oct. 8	57 <sup>48</sup> 04 0 <sup>17</sup>	17 <sup>1</sup> 0 <sup>2</sup>	54 <sup>53</sup> 9 <sup>25</sup> 13 <sup>30</sup>	28 <sup>6</sup> 0 <sup>8</sup>
18	56 <sup>48</sup> 87 0 <sup>17</sup>	16 <sup>9</sup> 0 <sup>5</sup>	53 <sup>53</sup> 55 <sup>95</sup> 13 <sup>48</sup>	29 <sup>4</sup> 0 <sup>3</sup>
28	56 <sup>48</sup> 70 0 <sup>15</sup>	16 <sup>4</sup> 0 <sup>6</sup>	42 <sup>53</sup> 47 13 <sup>32</sup>	29 <sup>7</sup> 0 <sup>3</sup>
Nov. 7	56 <sup>48</sup> 55 0 <sup>13</sup>	15 <sup>8</sup> 0 <sup>9</sup>	29 <sup>53</sup> 15 12 <sup>91</sup>	29 <sup>4</sup> 0 <sup>8</sup>
17	56 <sup>48</sup> 42 0 <sup>10</sup>	14 <sup>9</sup> 1 <sup>1</sup>	16 <sup>53</sup> 24 12 <sup>08</sup>	28 <sup>6</sup> 1 <sup>3</sup>
27	56 <sup>48</sup> 32 0 <sup>07</sup>	13 <sup>8</sup> 1 <sup>2</sup>	53 <sup>53</sup> 4 <sup>16</sup> 10 <sup>95</sup>	27 <sup>3</sup> 1 <sup>8</sup>
Dec. 7	56 <sup>48</sup> 25 0 <sup>03</sup>	12 <sup>6</sup> 1 <sup>4</sup>	52 <sup>53</sup> 53 <sup>21</sup> 9 <sup>49</sup>	25 <sup>5</sup> 2 <sup>3</sup>
17	56 <sup>48</sup> 22 0 <sup>00</sup>	11 <sup>2</sup> 1 <sup>5</sup>	43 <sup>53</sup> 72 7 <sup>73</sup>	23 <sup>2</sup> 2 <sup>7</sup>
27	56 <sup>48</sup> 22 0 <sup>04</sup>	9 <sup>7</sup> 1 <sup>6</sup>	35 <sup>53</sup> 99 5 <sup>71</sup>	20 <sup>5</sup> 3 <sup>0</sup>
37	48 <sup>m</sup> 56 <sup>s</sup> 26 <sup>s</sup> 0 <sup>s</sup> 04	5 8 <sup>1</sup> 1 <sup>6</sup>	52 <sup>m</sup> 30 <sup>s</sup> 28 <sup>s</sup> 5 <sup>s</sup> 71	55 <sup>48</sup> 17 <sup>5</sup> 3 <sup>0</sup>



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Capricorni.		$\alpha$ Pavonis.		$\rho$ Capricorni.	
	R.A.	Dec. South.	R.A.	Dec. South.	R.A.	Dec. South.
	<sup>h</sup> 20 <sup>m</sup> 10	<sup>°</sup> 12 <sup>'</sup> 56	<sup>h</sup> 20 <sup>m</sup> 15	<sup>°</sup> 57 <sup>'</sup> 8	<sup>h</sup> 20 <sup>m</sup> 21	<sup>°</sup> 18 <sup>'</sup> 14
Jan. 1	48° 00' 0.05	47° 3' 0.05	17° 22' 0.05	60° 4' 0.05	24° 03' 0.05	31° 9' 0.05
11	48° 05' 0.10	47° 7' 0.04	17° 27' 0.13	58° 3' 2.1	24° 08' 0.08	32° 0' 0.0
21	48° 15' 0.13	48° 1' 0.3	17° 32' 0.19	56° 8' 2.3	24° 16' 0.12	32° 0' 0.1
31	48° 28' 0.15	48° 4' 0.1	17° 40' 0.26	53° 4' 2.3	24° 28' 0.16	31° 9' 0.2
Feb. 10	48° 43' 0.19	48° 5' 0.0	17° 46' 0.31	51° 1' 2.1	24° 44' 0.18	31° 7' 0.3
20	48° 62' 0.21	48° 5' 0.1	18° 17' 0.36	48° 8' 2.3	24° 62' 0.20	31° 4' 0.5
Mar. 2	48° 83' 0.23	48° 4' 0.3	18° 53' 0.40	46° 7' 2.0	24° 82' 0.24	30° 9' 0.6
12	49° 06' 0.26	48° 1' 0.5	18° 53' 0.44	44° 7' 1.9	25° 06' 0.26	30° 3' 0.7
22	49° 32' 0.28	47° 6' 0.7	19° 37' 0.47	42° 8' 1.6	25° 32' 0.27	29° 6' 0.9
Apr. 1	49° 60' 0.29	46° 9' 0.9	19° 44' 0.49	41° 2' 1.3	25° 59' 0.29	28° 7' 1.0
11	49° 89' 0.30	46° 0' 1.0	20° 33' 0.51	39° 9' 1.1	25° 88' 0.31	27° 7' 1.1
21	50° 19' 0.31	45° 0' 1.1	20° 44' 0.53	38° 8' 0.8	26° 19' 0.32	26° 6' 1.2
May 1	50° 50' 0.30	43° 9' 1.2	21° 37' 0.52	38° 0' 0.4	26° 51' 0.32	25° 4' 1.1
11	50° 80' 0.31	42° 7' 1.2	21° 49' 0.50	37° 6' 0.1	26° 83' 0.31	24° 3' 1.2
21	51° 11' 0.29	41° 5' 1.2	22° 39' 0.49	37° 5' 0.2	27° 14' 0.30	23° 1' 1.1
31	51° 40' 0.27	40° 3' 1.2	22° 48' 0.46	37° 7' 0.7	27° 44' 0.29	22° 0' 1.0
June 10	51° 67' 0.25	39° 1' 1.1	23° 34' 0.41	38° 4' 0.9	27° 73' 0.27	21° 0' 0.9
20	51° 92' 0.22	38° 0' 1.0	23° 75' 0.36	39° 3' 1.2	28° 00' 0.23	20° 1' 0.8
30	52° 14' 0.18	37° 0' 0.8	24° 11' 0.29	40° 5' 1.5	28° 23' 0.19	19° 3' 0.6
July 10	52° 32' 0.13	36° 2' 0.7	24° 40' 0.23	42° 0' 1.8	28° 42' 0.15	18° 7' 0.4
20	52° 45' 0.09	35° 5' 0.5	24° 63' 0.15	43° 8' 2.0	28° 57' 0.11	18° 3' 0.2
30	52° 54' 0.05	35° 0' 0.3	24° 78' 0.07	45° 8' 2.0	28° 68' 0.06	18° 1' 0.1
Aug. 9	52° 59' 0.00	34° 7' 0.2	24° 85' 0.01	47° 8' 2.1	28° 74' 0.01	18° 0' 0.1
19	52° 59' 0.04	34° 5' 0.1	24° 84' 0.09	49° 9' 2.1	28° 75' 0.03	18° 1' 0.3
29	52° 55' 0.08	34° 4' 0.1	24° 75' 0.15	52° 0' 1.9	28° 72' 0.08	18° 4' 0.4
Sept. 8	52° 47' 0.12	34° 5' 0.3	24° 60' 0.22	53° 9' 1.8	28° 64' 0.11	18° 8' 0.4
18	52° 35' 0.14	34° 8' 0.3	24° 38' 0.27	55° 7' 1.5	28° 53' 0.14	19° 2' 0.5
28	52° 21' 0.16	35° 1' 0.3	24° 11' 0.30	57° 2' 1.1	28° 39' 0.16	19° 7' 0.5
Oct. 8	52° 05' 0.16	35° 4' 0.4	23° 81' 0.32	58° 3' 0.8	28° 23' 0.16	20° 2' 0.5
18	51° 89' 0.17	35° 8' 0.5	23° 49' 0.32	59° 1' 0.4	28° 07' 0.17	20° 7' 0.5
28	51° 72' 0.15	36° 3' 0.4	23° 17' 0.31	59° 5' 0.1	27° 50' 0.15	21° 2' 0.5
Nov. 7	51° 57' 0.13	36° 7' 0.5	22° 86' 0.28	59° 4' 0.5	27° 75' 0.14	21° 7' 0.3
17	51° 44' 0.11	37° 2' 0.5	22° 58' 0.23	58° 9' 0.9	27° 61' 0.12	22° 0' 0.4
27	51° 33' 0.07	37° 7' 0.5	22° 35' 0.18	58° 0' 1.3	27° 49' 0.08	22° 4' 0.3
Dec. 7	51° 26' 0.04	38° 2' 0.5	22° 17' 0.12	56° 7' 1.6	27° 41' 0.04	22° 7' 0.2
17	51° 22' 0.00	38° 7' 0.4	22° 05' 0.04	55° 1' 1.9	27° 37' 0.01	22° 9' 0.2
27	51° 22' 0.04	39° 1' 0.5	22° 01' 0.02	53° 2' 2.0	27° 36' 0.03	23° 1' 0.1
37	51° 26' 0.04	39° 6' 0.5	22° 03' 0.02	51° 2' 2.0	27° 39' 0.03	23° 2' 0.1



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Cygni.		32 Vulpeculæ.		61 Cygni.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 20 <sup>m</sup> 36	<sup>°</sup> 44 <sup>'</sup> 48	<sup>h</sup> 20 <sup>m</sup> 48	<sup>°</sup> 27 <sup>'</sup> 33	<sup>h</sup> 21 <sup>m</sup> 1	<sup>°</sup> 38 <sup>'</sup> 6
Jan. 1	57° 90' 0.05	67° 0' 2.9	59° 23' 0.02	55° 8' 2.4	2° 05' 0.06	46° 7' 2.5
11	57° 85' 0.01	64° 1' 3.0	59° 21' 0.01	53° 4' 2.4	1° 99' 0.01	44° 2' 2.6
21	57° 84' 0.05	61° 1' 3.3	59° 22' 0.05	51° 0' 2.6	1° 98' 0.04	41° 6' 2.6
31	57° 89' 0.10	57° 8' 3.0	59° 27' 0.10	48° 4' 2.3	2° 02' 0.08	39° 0' 3.0
Feb. 10	57° 99' 0.15	54° 8' 2.8	59° 37' 0.13	46° 1' 2.1	2° 10' 0.13	36° 0' 2.5
20	58° 14' 0.20	52° 0' 2.4	59° 50' 0.17	44° 0' 1.8	2° 23' 0.17	33° 5' 2.1
Mar. 2	58° 34' 0.24	49° 6' 2.1	59° 67' 0.20	42° 2' 1.5	2° 40' 0.21	31° 4' 1.8
12	58° 58' 0.28	47° 5' 1.6	59° 87' 0.23	40° 7' 1.0	2° 61' 0.25	29° 6' 1.4
22	58° 86' 0.32	45° 9' 0.9	60° 10' 0.26	39° 7' 0.6	2° 86' 0.28	28° 2' 0.9
Apr. 1	59° 18' 0.34	45° 0' 0.4	60° 36' 0.28	39° 1' 0.1	3° 14' 0.31	27° 3' 0.3
11	59° 52' 0.35	44° 6' 0.1	60° 64' 0.30	39° 0' 0.4	3° 45' 0.33	27° 0' 0.2
21	59° 87' 0.37	44° 7' 0.8	60° 94' 0.32	39° 4' 1.0	3° 78' 0.35	27° 2' 0.7
May 1	60° 24' 0.37	45° 5' 1.3	61° 26' 0.32	40° 4' 1.3	4° 13' 0.35	27° 9' 1.3
11	60° 61' 0.35	46° 8' 1.8	61° 58' 0.31	41° 7' 1.8	4° 48' 0.35	29° 2' 1.7
21	60° 96' 0.34	48° 6' 2.3	61° 89' 0.30	43° 5' 2.1	4° 83' 0.35	30° 9' 2.2
31	61° 30' 0.31	50° 9' 2.6	62° 19' 0.29	45° 6' 2.4	5° 18' 0.32	33° 1' 2.5
June 10	61° 61' 0.28	53° 5' 2.9	62° 48' 0.26	48° 0' 2.6	5° 50' 0.29	35° 6' 2.8
20	61° 89' 0.23	56° 4' 3.1	62° 74' 0.23	50° 6' 2.7	5° 79' 0.26	38° 4' 3.0
30	62° 12' 0.18	59° 5' 3.3	62° 97' 0.19	51° 3' 2.7	6° 05' 0.21	41° 4' 3.2
July 10	62° 30' 0.13	62° 8' 3.2	63° 16' 0.14	56° 0' 2.8	6° 26' 0.17	44° 6' 3.2
20	62° 43' 0.07	66° 0' 3.3	63° 30' 0.10	58° 8' 2.7	6° 43' 0.12	47° 8' 3.2
30	62° 50' 0.02	69° 3' 3.1	63° 40' 0.06	61° 5' 2.6	6° 55' 0.06	51° 0' 3.1
Aug. 9	62° 52' 0.04	72° 4' 3.0	63° 46' 0.00	64° 1' 2.4	6° 61' 0.02	54° 1' 3.0
19	62° 48' 0.10	75° 4' 2.7	63° 46' 0.04	66° 5' 2.1	6° 63' 0.04	57° 1' 2.7
29	62° 38' 0.14	78° 1' 2.4	63° 42' 0.08	68° 6' 1.9	6° 59' 0.09	59° 8' 2.4
Sept. 8	62° 24' 0.19	80° 5' 2.1	63° 34' 0.12	70° 5' 1.6	6° 50' 0.12	62° 2' 2.1
18	62° 05' 0.22	82° 6' 1.7	63° 22' 0.16	72° 1' 1.2	6° 38' 0.16	64° 3' 1.8
28	61° 83' 0.25	84° 3' 1.3	63° 06' 0.18	73° 3' 0.9	6° 22' 0.19	66° 1' 1.4
Oct. 8	61° 58' 0.26	85° 6' 0.8	62° 88' 0.18	74° 2' 0.3	6° 03' 0.21	67° 5' 1.0
18	61° 32' 0.27	86° 4' 0.3	62° 70' 0.19	74° 7' 0.1	5° 52' 0.22	68° 5' 0.6
28	61° 05' 0.27	86° 7' 0.2	62° 51' 0.20	74° 8' 0.2	5° 60' 0.21	69° 1' 0.0
Nov. 7	60° 78' 0.26	86° 5' 0.7	62° 31' 0.18	74° 6' 0.7	5° 39' 0.20	69° 1' 0.4
17	60° 52' 0.23	85° 8' 1.2	62° 13' 0.16	73° 9' 1.0	5° 19' 0.20	68° 7' 0.8
27	60° 29' 0.20	84° 6' 1.6	61° 97' 0.14	72° 9' 1.4	4° 99' 0.18	67° 9' 1.3
Dec. 7	60° 09' 0.17	83° 0' 2.1	61° 83' 0.11	71° 5' 1.8	4° 81' 0.14	66° 6' 1.7
17	59° 92' 0.12	80° 9' 2.5	61° 72' 0.07	69° 7' 2.0	4° 67' 0.10	64° 9' 2.1
27	59° 80' 0.08	78° 4' 2.8	61° 65' 0.04	67° 7' 2.2	4° 57' 0.07	62° 8' 2.3
37	59° 72' 0.08	75° 6' 2.8	61° 61' 0.04	65° 5' 2.2	4° 50' 0.07	60° 5' 2.3



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	ζ Cygni.		α Cephei.		β Aquarii.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. South.
	<sup>h</sup> 21 <sup>m</sup> 7	<sup>°</sup> 29 <sup>'</sup> 41	<sup>h</sup> 21 <sup>m</sup> 15	<sup>°</sup> 62 <sup>'</sup> 1	<sup>h</sup> 21 <sup>m</sup> 24	<sup>°</sup> 6 <sup>'</sup> 8
Jan. 1	22° 30' 0.05	45° 0' 2.2	26° 31' 0.21	75° 8' 2.8	40° 77' 0.02	34° 3' 0.6
11	22° 25' 0.01	42° 8' 2.4	26° 10' 0.15	73° 0' 3.0	40° 75' 0.01	34° 9' 0.6
21	22° 24' 0.04	40° 4' 2.5	25° 95' 0.06	70° 0' 3.3	40° 76' 0.05	35° 5' 0.6
31	22° 28' 0.07	37° 9' 2.6	25° 89' 0.01	66° 7' 3.6	40° 81' 0.08	36° 1' 0.4
Feb. 10	22° 35' 0.11	35° 3' 2.2	25° 90' 0.10	63° 1' 3.3	40° 89' 0.10	36° 5' 0.2
20	22° 46' 0.15	33° 1' 1.9	26° 00' 0.19	59° 8' 3.0	40° 99' 0.14	36° 7' 0.0
Mar. 2	22° 61' 0.18	31° 2' 1.6	26° 19' 0.26	56° 8' 2.7	41° 13' 0.17	36° 7' 0.3
12	22° 79' 0.22	29° 6' 1.2	26° 45' 0.33	54° 1' 2.2	41° 30' 0.20	36° 4' 0.4
22	23° 01' 0.25	28° 4' 0.8	26° 78' 0.39	51° 9' 1.7	41° 50' 0.22	36° 0' 0.7
Apr. 1	23° 26' 0.28	27° 6' 0.2	27° 17' 0.45	50° 2' 1.2	41° 72' 0.25	35° 3' 1.0
11	23° 54' 0.30	27° 4' 0.3	27° 62' 0.48	49° 0' 0.6	41° 97' 0.27	34° 3' 1.1
21	23° 84' 0.31	27° 7' 0.8	28° 10' 0.51	48° 4' 0.1	42° 24' 0.29	33° 2' 1.4
May 1	24° 15' 0.32	28° 5' 1.2	28° 61' 0.51	48° 5' 0.7	42° 53' 0.30	31° 8' 1.5
11	24° 47' 0.33	29° 7' 1.7	29° 12' 0.51	49° 2' 1.3	42° 83' 0.31	30° 3' 1.6
21	24° 80' 0.31	31° 4' 2.0	29° 63' 0.49	50° 5' 1.8	43° 14' 0.31	28° 7' 1.7
31	25° 11' 0.30	33° 4' 2.3	30° 12' 0.45	52° 3' 2.3	43° 45' 0.30	27° 0' 1.7
June 10	25° 41' 0.28	35° 7' 2.6	30° 57' 0.40	54° 6' 2.7	43° 75' 0.28	25° 3' 1.7
20	25° 69' 0.25	38° 3' 2.8	30° 97' 0.35	57° 3' 3.0	44° 03' 0.26	23° 6' 1.5
30	25° 94' 0.20	41° 1' 2.8	31° 32' 0.28	60° 3' 3.3	44° 29' 0.23	22° 1' 1.5
July 10	26° 14' 0.17	43° 9' 2.8	31° 60' 0.21	63° 6' 3.5	44° 52' 0.20	20° 6' 1.3
20	26° 31' 0.12	46° 7' 2.8	31° 81' 0.13	67° 1' 3.6	44° 72' 0.16	19° 3' 1.1
30	26° 43' 0.07	49° 5' 2.7	31° 94' 0.04	70° 7' 3.6	44° 88' 0.11	18° 2' 0.9
Aug. 9	26° 50' 0.02	52° 2' 2.6	31° 98' 0.03	74° 3' 3.5	44° 99' 0.06	17° 3' 0.7
19	26° 52' 0.02	54° 8' 2.3	31° 95' 0.11	77° 8' 3.4	45° 05' 0.03	16° 6' 0.5
29	26° 50' 0.07	57° 1' 2.1	31° 84' 0.19	81° 2' 3.1	45° 08' 0.02	16° 1' 0.3
Sept. 8	26° 43' 0.11	59° 2' 1.8	31° 65' 0.25	84° 3' 2.8	45° 06' 0.06	15° 8' 0.1
18	26° 32' 0.14	61° 0' 1.4	31° 40' 0.31	87° 1' 2.5	45° 00' 0.09	15° 7' 0.1
28	26° 18' 0.17	62° 4' 1.0	31° 09' 0.36	89° 6' 2.1	44° 91' 0.12	15° 8' 0.2
Oct. 8	26° 01' 0.19	63° 4' 0.7	30° 73' 0.40	91° 7' 1.7	44° 79' 0.13	16° 0' 0.3
18	25° 82' 0.19	64° 1' 0.4	30° 33' 0.42	93° 4' 1.2	44° 66' 0.14	16° 3' 0.5
28	25° 63' 0.19	64° 5' 0.1	29° 91' 0.43	94° 6' 0.6	44° 52' 0.15	16° 8' 0.5
Nov. 7	25° 44' 0.19	64° 4' 0.5	29° 48' 0.44	95° 2' 0.0	44° 37' 0.14	17° 3' 0.6
17	25° 25' 0.17	63° 9' 0.9	29° 04' 0.42	95° 2' 0.5	44° 23' 0.13	17° 9' 0.7
27	25° 08' 0.15	63° 0' 1.3	28° 62' 0.39	94° 7' 1.1	44° 10' 0.11	18° 6' 0.7
Dec. 7	24° 93' 0.13	61° 7' 1.6	28° 23' 0.36	93° 6' 1.7	43° 99' 0.08	19° 3' 0.7
17	24° 80' 0.09	60° 1' 1.9	27° 87' 0.31	91° 9' 2.2	43° 91' 0.06	20° 0' 0.7
27	24° 71' 0.06	58° 2' 2.2	27° 56' 0.25	89° 7' 2.5	43° 85' 0.03	20° 7' 0.7
37	24° 65'	56° 0'	27° 31'	87° 2'	43° 82'	21° 4'



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\beta$ Cephei.		$\epsilon$ Pegasi.		16 Pegasi.	
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 21 <sup>m</sup> 26	<sup>°</sup> 69 <sup>'</sup> 59	<sup>h</sup> 21 <sup>m</sup> 37	<sup>°</sup> 9 <sup>'</sup> 16	<sup>h</sup> 21 <sup>m</sup> 47	<sup>°</sup> 25 <sup>'</sup> 18
Jan. 1	55° 50' 0.37	34° 9' 2.6	46° 25' 0.04	47° 6' 1.3	7° 18' 0.07	54° 4' 1.9
11	55° 53' 0.27	32° 3' 3.0	46° 21' 0.01	46° 3' 1.4	7° 11' 0.04	52° 5' 2.0
21	55° 26' 0.16	29° 3' 3.3	46° 20' 0.02	44° 9' 1.4	7° 07' 0.01	50° 5' 2.1
31	55° 10' 0.05	26° 0' 3.7	46° 22' 0.05	43° 5' 1.3	7° 06' 0.03	48° 4' 2.1
Feb. 10	55° 05' 0.08	22° 3' 3.3	46° 23' 0.08	41° 0' 1.1	7° 09' 0.07	46° 3' 2.2
20	55° 13' 0.19	19° 0' 3.1	46° 36' 0.12	41° 0' 0.9	7° 16' 0.11	44° 1' 1.7
Mar. 2	55° 32' 0.30	15° 9' 2.9	46° 48' 0.15	40° 1' 0.6	7° 27' 0.14	42° 4' 1.5
12	55° 62' 0.41	13° 0' 2.5	46° 63' 0.18	39° 5' 0.3	7° 41' 0.18	40° 9' 1.1
22	56° 03' 0.49	10° 5' 2.0	46° 81' 0.21	39° 2' 0.1	7° 59' 0.21	39° 8' 0.7
Apr. 1	56° 52' 0.57	8° 5' 1.5	47° 02' 0.24	39° 3' 0.3	7° 80' 0.25	39° 1' 0.2
11	57° 09' 0.62	7° 0' 0.8	47° 26' 0.27	39° 6' 0.7	8° 05' 0.27	38° 9' 0.2
21	57° 71' 0.66	6° 2' 0.2	47° 53' 0.28	40° 3' 1.1	8° 32' 0.30	39° 1' 0.6
May 1	58° 37' 0.67	6° 0' 0.4	47° 81' 0.30	41° 4' 1.4	8° 62' 0.31	39° 7' 1.1
11	59° 04' 0.67	6° 4' 1.0	48° 11' 0.31	42° 8' 1.7	8° 93' 0.32	40° 8' 1.5
21	59° 71' 0.64	7° 4' 1.6	48° 42' 0.30	44° 5' 1.8	9° 25' 0.32	42° 3' 1.8
31	60° 35' 0.59	9° 0' 2.1	48° 72' 0.30	46° 3' 2.0	9° 57' 0.31	44° 1' 2.1
June 10	60° 94' 0.53	11° 1' 2.5	49° 02' 0.29	48° 3' 2.1	9° 88' 0.30	46° 2' 2.4
20	61° 47' 0.46	13° 6' 2.9	49° 31' 0.26	50° 4' 2.2	10° 18' 0.27	48° 6' 2.6
30	61° 93' 0.37	16° 5' 3.2	49° 57' 0.23	52° 6' 2.1	10° 45' 0.24	51° 2' 2.7
July 10	62° 30' 0.27	19° 7' 3.5	49° 80' 0.20	54° 7' 2.1	10° 69' 0.21	53° 9' 2.6
20	62° 57' 0.17	23° 2' 3.6	50° 00' 0.15	56° 8' 1.9	10° 90' 0.16	56° 5' 2.7
30	62° 74' 0.06	26° 8' 3.6	50° 15' 0.11	58° 7' 1.8	11° 06' 0.12	59° 2' 2.6
Aug. 9	62° 80' 0.05	30° 4' 3.7	50° 26' 0.07	60° 5' 1.6	11° 18' 0.07	61° 8' 2.4
19	62° 75' 0.15	34° 1' 3.5	50° 33' 0.03	62° 1' 1.4	11° 25' 0.02	64° 2' 2.3
29	62° 60' 0.25	37° 6' 3.3	50° 36' 0.01	63° 5' 1.2	11° 27' 0.02	66° 5' 2.0
Sept. 8	62° 35' 0.34	40° 9' 3.1	50° 35' 0.05	64° 7' 0.9	11° 25' 0.06	68° 5' 1.8
18	62° 01' 0.43	44° 0' 2.8	50° 30' 0.09	65° 6' 0.7	11° 19' 0.09	70° 3' 1.5
28	61° 58' 0.49	46° 8' 2.4	50° 21' 0.12	66° 3' 0.5	11° 10' 0.13	71° 8' 1.1
Oct. 8	61° 09' 0.55	49° 2' 1.9	50° 09' 0.13	66° 8' 0.2	10° 97' 0.15	72° 9' 0.9
18	60° 54' 0.59	51° 1' 1.5	49° 96' 0.14	67° 0' 0.1	10° 82' 0.16	73° 8' 0.5
28	59° 95' 0.62	52° 6' 0.9	49° 82' 0.15	66° 9' 0.2	10° 66' 0.17	74° 3' 0.1
Nov. 7	59° 33' 0.62	53° 5' 0.4	49° 67' 0.14	66° 7' 0.5	10° 49' 0.17	74° 4' 0.2
17	58° 71' 0.62	53° 9' 0.2	49° 53' 0.14	66° 2' 0.7	10° 32' 0.16	74° 2' 0.6
27	58° 09' 0.59	53° 7' 0.9	49° 39' 0.12	65° 5' 0.9	10° 16' 0.15	73° 6' 1.0
Dec. 7	57° 50' 0.54	52° 8' 1.4	49° 27' 0.10	64° 6' 1.1	10° 01' 0.13	72° 6' 1.2
17	56° 96' 0.49	51° 4' 1.9	49° 17' 0.07	63° 5' 1.2	9° 88' 0.10	71° 4' 1.5
27	56° 47' 0.41	49° 5' 2.4	49° 10' 0.05	62° 3' 1.3	9° 78' 0.09	69° 9' 1.8
37	56° 06' 0.41	47° 1' 2.4	49° 05' 0.05	61° 0' 1.3	9° 69' 0.09	68° 1' 1.8



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Aquarii.		$\alpha$ Gruis.		$\theta$ Aquarii.	
	R. A.	Dec. South.	R. A.	Dec. South.	R. A.	Dec. South.
	<sup>h</sup> 21 <sup>m</sup> 59	<sup>°</sup> 0 <sup>'</sup> 56	<sup>h</sup> 21 <sup>m</sup> 59	<sup>°</sup> 47 <sup>'</sup> 35	<sup>h</sup> 22 <sup>m</sup> 9	<sup>°</sup> 8 <sup>'</sup> 25
Jan. 1	4 <sup>s</sup> 50 <sup>s</sup> 0 <sup>s</sup> 05	66 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 8	59 <sup>s</sup> 03 <sup>s</sup> 0 <sup>s</sup> 08	35 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 4	56 <sup>s</sup> 49 <sup>s</sup> 0 <sup>s</sup> 05	53 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 5
11	4 <sup>s</sup> 45 <sup>s</sup> 0 <sup>s</sup> 02	67 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 8	58 <sup>s</sup> 95 <sup>s</sup> 0 <sup>s</sup> 05	33 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 7	56 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 03	53 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 4
21	4 <sup>s</sup> 43 <sup>s</sup> 0 <sup>s</sup> 01	67 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 8	58 <sup>s</sup> 90 <sup>s</sup> 0 <sup>s</sup> 00	32 <sup>s</sup> 0 <sup>s</sup> 1 <sup>s</sup> 9	56 <sup>s</sup> 41 <sup>s</sup> 0 <sup>s</sup> 00	54 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 3
31	4 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 03	68 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 6	58 <sup>s</sup> 90 <sup>s</sup> 0 <sup>s</sup> 05	30 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 1	56 <sup>s</sup> 41 <sup>s</sup> 0 <sup>s</sup> 03	54 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 1
Feb. 10	4 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 07	69 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 5	58 <sup>s</sup> 95 <sup>s</sup> 0 <sup>s</sup> 11	28 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 6	56 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 07	54 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 0
20	4 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 11	69 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 2	59 <sup>s</sup> 06 <sup>s</sup> 0 <sup>s</sup> 15	25 <sup>s</sup> 4 <sup>s</sup> 2 <sup>s</sup> 4	56 <sup>s</sup> 51 <sup>s</sup> 0 <sup>s</sup> 09	54 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 2
Mar. 2	4 <sup>s</sup> 65 <sup>s</sup> 0 <sup>s</sup> 13	69 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 0	59 <sup>s</sup> 21 <sup>s</sup> 0 <sup>s</sup> 19	23 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 5	56 <sup>s</sup> 60 <sup>s</sup> 0 <sup>s</sup> 13	54 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 5
12	4 <sup>s</sup> 78 <sup>s</sup> 0 <sup>s</sup> 16	69 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 2	59 <sup>s</sup> 40 <sup>s</sup> 0 <sup>s</sup> 23	20 <sup>s</sup> 5 <sup>s</sup> 2 <sup>s</sup> 5	56 <sup>s</sup> 73 <sup>s</sup> 0 <sup>s</sup> 15	53 <sup>s</sup> 8 <sup>s</sup> 0 <sup>s</sup> 7
22	4 <sup>s</sup> 94 <sup>s</sup> 0 <sup>s</sup> 20	69 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 5	59 <sup>s</sup> 63 <sup>s</sup> 0 <sup>s</sup> 28	18 <sup>s</sup> 0 <sup>s</sup> 2 <sup>s</sup> 5	56 <sup>s</sup> 88 <sup>s</sup> 0 <sup>s</sup> 19	53 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 9
Apr. 1	5 <sup>s</sup> 14 <sup>s</sup> 0 <sup>s</sup> 23	69 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 8	59 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 32	15 <sup>s</sup> 5 <sup>s</sup> 2 <sup>s</sup> 4	57 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 23	52 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 1
11	5 <sup>s</sup> 37 <sup>s</sup> 0 <sup>s</sup> 25	68 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 1	60 <sup>s</sup> 23 <sup>s</sup> 0 <sup>s</sup> 35	13 <sup>s</sup> 1 <sup>s</sup> 2 <sup>s</sup> 3	57 <sup>s</sup> 30 <sup>s</sup> 0 <sup>s</sup> 25	51 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 3
21	5 <sup>s</sup> 62 <sup>s</sup> 0 <sup>s</sup> 27	67 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 3	60 <sup>s</sup> 58 <sup>s</sup> 0 <sup>s</sup> 38	10 <sup>s</sup> 8 <sup>s</sup> 2 <sup>s</sup> 1	57 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 27	49 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 5
May 1	5 <sup>s</sup> 89 <sup>s</sup> 0 <sup>s</sup> 29	66 <sup>s</sup> 0 <sup>s</sup> 1 <sup>s</sup> 3	60 <sup>s</sup> 96 <sup>s</sup> 0 <sup>s</sup> 41	8 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 8	57 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 29	48 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 7
11	6 <sup>s</sup> 18 <sup>s</sup> 0 <sup>s</sup> 31	64 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 7	61 <sup>s</sup> 37 <sup>s</sup> 0 <sup>s</sup> 42	6 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 6	58 <sup>s</sup> 11 <sup>s</sup> 0 <sup>s</sup> 31	46 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 7
21	6 <sup>s</sup> 49 <sup>s</sup> 0 <sup>s</sup> 31	62 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 8	61 <sup>s</sup> 79 <sup>s</sup> 0 <sup>s</sup> 44	5 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 2	58 <sup>s</sup> 42 <sup>s</sup> 0 <sup>s</sup> 31	44 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 8
31	6 <sup>s</sup> 80 <sup>s</sup> 0 <sup>s</sup> 30	61 <sup>s</sup> 0 <sup>s</sup> 1 <sup>s</sup> 9	62 <sup>s</sup> 23 <sup>s</sup> 0 <sup>s</sup> 43	4 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 9	58 <sup>s</sup> 73 <sup>s</sup> 0 <sup>s</sup> 32	43 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 8
June 10	7 <sup>s</sup> 10 <sup>s</sup> 0 <sup>s</sup> 29	59 <sup>s</sup> 1 <sup>s</sup> 1 <sup>s</sup> 9	62 <sup>s</sup> 66 <sup>s</sup> 0 <sup>s</sup> 41	3 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 6	59 <sup>s</sup> 05 <sup>s</sup> 0 <sup>s</sup> 30	41 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 8
20	7 <sup>s</sup> 39 <sup>s</sup> 0 <sup>s</sup> 28	57 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 8	63 <sup>s</sup> 07 <sup>s</sup> 0 <sup>s</sup> 39	2 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 2	59 <sup>s</sup> 35 <sup>s</sup> 0 <sup>s</sup> 29	39 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 7
30	7 <sup>s</sup> 67 <sup>s</sup> 0 <sup>s</sup> 25	55 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 8	63 <sup>s</sup> 46 <sup>s</sup> 0 <sup>s</sup> 36	2 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 3	59 <sup>s</sup> 64 <sup>s</sup> 0 <sup>s</sup> 27	37 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 5
July 10	7 <sup>s</sup> 92 <sup>s</sup> 0 <sup>s</sup> 22	53 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 7	63 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 31	2 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 7	59 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 23	36 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 3
20	8 <sup>s</sup> 14 <sup>s</sup> 0 <sup>s</sup> 18	51 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 4	64 <sup>s</sup> 13 <sup>s</sup> 0 <sup>s</sup> 26	3 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 9	60 <sup>s</sup> 14 <sup>s</sup> 0 <sup>s</sup> 19	35 <sup>s</sup> 0 <sup>s</sup> 1 <sup>s</sup> 1
30	8 <sup>s</sup> 32 <sup>s</sup> 0 <sup>s</sup> 14	50 <sup>s</sup> 5 <sup>s</sup> 1 <sup>s</sup> 3	64 <sup>s</sup> 39 <sup>s</sup> 0 <sup>s</sup> 21	4 <sup>s</sup> 3 <sup>s</sup> 1 <sup>s</sup> 3	60 <sup>s</sup> 33 <sup>s</sup> 0 <sup>s</sup> 16	33 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 9
Aug. 9	8 <sup>s</sup> 46 <sup>s</sup> 0 <sup>s</sup> 10	49 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 1	64 <sup>s</sup> 60 <sup>s</sup> 0 <sup>s</sup> 14	5 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 6	60 <sup>s</sup> 49 <sup>s</sup> 0 <sup>s</sup> 11	33 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 7
19	8 <sup>s</sup> 56 <sup>s</sup> 0 <sup>s</sup> 05	48 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 9	64 <sup>s</sup> 74 <sup>s</sup> 0 <sup>s</sup> 08	7 <sup>s</sup> 2 <sup>s</sup> 1 <sup>s</sup> 7	60 <sup>s</sup> 60 <sup>s</sup> 0 <sup>s</sup> 06	32 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 4
29	8 <sup>s</sup> 61 <sup>s</sup> 0 <sup>s</sup> 01	47 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 6	64 <sup>s</sup> 82 <sup>s</sup> 0 <sup>s</sup> 01	8 <sup>s</sup> 9 <sup>s</sup> 1 <sup>s</sup> 8	60 <sup>s</sup> 66 <sup>s</sup> 0 <sup>s</sup> 03	31 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 2
Sept. 8	8 <sup>s</sup> 62 <sup>s</sup> 0 <sup>s</sup> 03	46 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 4	64 <sup>s</sup> 83 <sup>s</sup> 0 <sup>s</sup> 04	10 <sup>s</sup> 7 <sup>s</sup> 2 <sup>s</sup> 0	60 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 02	31 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 0
18	8 <sup>s</sup> 59 <sup>s</sup> 0 <sup>s</sup> 06	46 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 2	64 <sup>s</sup> 79 <sup>s</sup> 0 <sup>s</sup> 10	12 <sup>s</sup> 7 <sup>s</sup> 2 <sup>s</sup> 1	60 <sup>s</sup> 67 <sup>s</sup> 0 <sup>s</sup> 05	31 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 2
28	8 <sup>s</sup> 53 <sup>s</sup> 0 <sup>s</sup> 09	46 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 0	64 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 15	14 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 9	60 <sup>s</sup> 62 <sup>s</sup> 0 <sup>s</sup> 08	31 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 4
Oct. 8	8 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 11	46 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 1	64 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 19	16 <sup>s</sup> 7 <sup>s</sup> 1 <sup>s</sup> 7	60 <sup>s</sup> 54 <sup>s</sup> 0 <sup>s</sup> 11	32 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 4
18	8 <sup>s</sup> 33 <sup>s</sup> 0 <sup>s</sup> 13	46 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 3	64 <sup>s</sup> 35 <sup>s</sup> 0 <sup>s</sup> 21	18 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 4	60 <sup>s</sup> 43 <sup>s</sup> 0 <sup>s</sup> 12	32 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 6
28	8 <sup>s</sup> 20 <sup>s</sup> 0 <sup>s</sup> 14	46 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 5	64 <sup>s</sup> 14 <sup>s</sup> 0 <sup>s</sup> 23	19 <sup>s</sup> 8 <sup>s</sup> 1 <sup>s</sup> 1	60 <sup>s</sup> 31 <sup>s</sup> 0 <sup>s</sup> 13	33 <sup>s</sup> 3 <sup>s</sup> 0 <sup>s</sup> 6
Nov. 7	8 <sup>s</sup> 06 <sup>s</sup> 0 <sup>s</sup> 14	46 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 6	63 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 22	20 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 7	60 <sup>s</sup> 18 <sup>s</sup> 0 <sup>s</sup> 14	33 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 6
17	7 <sup>s</sup> 92 <sup>s</sup> 0 <sup>s</sup> 12	47 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 6	63 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 22	21 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 4	60 <sup>s</sup> 04 <sup>s</sup> 0 <sup>s</sup> 13	34 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 7
27	7 <sup>s</sup> 80 <sup>s</sup> 0 <sup>s</sup> 12	48 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 8	63 <sup>s</sup> 47 <sup>s</sup> 0 <sup>s</sup> 20	22 <sup>s</sup> 0 <sup>s</sup> 0 <sup>s</sup> 1	59 <sup>s</sup> 91 <sup>s</sup> 0 <sup>s</sup> 12	35 <sup>s</sup> 2 <sup>s</sup> 0 <sup>s</sup> 7
Dec. 7	7 <sup>s</sup> 68 <sup>s</sup> 0 <sup>s</sup> 10	48 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 8	63 <sup>s</sup> 27 <sup>s</sup> 0 <sup>s</sup> 18	21 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 4	59 <sup>s</sup> 79 <sup>s</sup> 0 <sup>s</sup> 10	35 <sup>s</sup> 9 <sup>s</sup> 0 <sup>s</sup> 6
17	7 <sup>s</sup> 58 <sup>s</sup> 0 <sup>s</sup> 08	49 <sup>s</sup> 7 <sup>s</sup> 0 <sup>s</sup> 8	63 <sup>s</sup> 09 <sup>s</sup> 0 <sup>s</sup> 14	21 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 9	59 <sup>s</sup> 69 <sup>s</sup> 0 <sup>s</sup> 08	36 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 6
27	7 <sup>s</sup> 50 <sup>s</sup> 0 <sup>s</sup> 06	50 <sup>s</sup> 5 <sup>s</sup> 0 <sup>s</sup> 9	62 <sup>s</sup> 95 <sup>s</sup> 0 <sup>s</sup> 10	20 <sup>s</sup> 6 <sup>s</sup> 1 <sup>s</sup> 2	59 <sup>s</sup> 61 <sup>s</sup> 0 <sup>s</sup> 06	37 <sup>s</sup> 1 <sup>s</sup> 0 <sup>s</sup> 5
37	7 <sup>s</sup> 44 <sup>s</sup> 0 <sup>s</sup> 04	51 <sup>s</sup> 4 <sup>s</sup> 0 <sup>s</sup> 9	62 <sup>s</sup> 85 <sup>s</sup> 0 <sup>s</sup> 10	19 <sup>s</sup> 4 <sup>s</sup> 1 <sup>s</sup> 4	59 <sup>s</sup> 55 <sup>s</sup> 0 <sup>s</sup> 04	37 <sup>s</sup> 6 <sup>s</sup> 0 <sup>s</sup> 5



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\eta$ Aquarii.		$\zeta$ Pegasi.		$\alpha$ Piscis Australia. (Fomalhaut)	
	R. A.	Dec. South.	R. A.	Dec. North.	R. A.	Dec. South.
	<sup>h</sup> 22 <sup>m</sup> 28	<sup>°</sup> 0 <sup>'</sup> 46	<sup>h</sup> 22 <sup>m</sup> 34	<sup>°</sup> 10 <sup>'</sup> 8	<sup>h</sup> 22 <sup>m</sup> 50	<sup>°</sup> 30 <sup>'</sup> 18
Jan. 1	38 <sup>s</sup> .83	77 <sup>s</sup> .4	57 <sup>s</sup> .06	70 <sup>s</sup> .8	25 <sup>s</sup> .77	52 <sup>s</sup> .9
11	38 <sup>s</sup> .76	78 <sup>s</sup> .2	56 <sup>s</sup> .99	69 <sup>s</sup> .5	25 <sup>s</sup> .68	52 <sup>s</sup> .5
21	38 <sup>s</sup> .71	79 <sup>s</sup> .0	56 <sup>s</sup> .93	68 <sup>s</sup> .3	25 <sup>s</sup> .61	51 <sup>s</sup> .9
31	38 <sup>s</sup> .69	79 <sup>s</sup> .7	56 <sup>s</sup> .90	67 <sup>s</sup> .2	25 <sup>s</sup> .56	51 <sup>s</sup> .0
	0 <sup>s</sup> .01	0 <sup>s</sup> .5	0 <sup>s</sup> .01	1 <sup>s</sup> .2	0 <sup>s</sup> .01	1 <sup>s</sup> .1
Feb. 10	38 <sup>s</sup> .70	80 <sup>s</sup> .2	56 <sup>s</sup> .89	66 <sup>s</sup> .0	25 <sup>s</sup> .55	49 <sup>s</sup> .9
20	38 <sup>s</sup> .73	80 <sup>s</sup> .6	56 <sup>s</sup> .91	64 <sup>s</sup> .9	25 <sup>s</sup> .57	48 <sup>s</sup> .5
Mar. 2	38 <sup>s</sup> .81	80 <sup>s</sup> .9	56 <sup>s</sup> .98	64 <sup>s</sup> .0	25 <sup>s</sup> .64	46 <sup>s</sup> .7
12	38 <sup>s</sup> .91	80 <sup>s</sup> .9	57 <sup>s</sup> .07	63 <sup>s</sup> .3	25 <sup>s</sup> .73	44 <sup>s</sup> .9
	0 <sup>s</sup> .14	0 <sup>s</sup> .3	0 <sup>s</sup> .13	0 <sup>s</sup> .3	0 <sup>s</sup> .13	2 <sup>s</sup> .0
Apr. 22	39 <sup>s</sup> .05	80 <sup>s</sup> .6	57 <sup>s</sup> .20	63 <sup>s</sup> .0	25 <sup>s</sup> .86	42 <sup>s</sup> .9
1	39 <sup>s</sup> .22	80 <sup>s</sup> .1	57 <sup>s</sup> .36	62 <sup>s</sup> .9	26 <sup>s</sup> .03	40 <sup>s</sup> .8
11	39 <sup>s</sup> .43	79 <sup>s</sup> .3	57 <sup>s</sup> .56	63 <sup>s</sup> .2	26 <sup>s</sup> .24	38 <sup>s</sup> .6
21	39 <sup>s</sup> .66	78 <sup>s</sup> .2	57 <sup>s</sup> .80	63 <sup>s</sup> .9	26 <sup>s</sup> .49	36 <sup>s</sup> .4
	0 <sup>s</sup> .26	1 <sup>s</sup> .3	0 <sup>s</sup> .26	0 <sup>s</sup> .9	0 <sup>s</sup> .28	2 <sup>s</sup> .2
May 1	39 <sup>s</sup> .92	76 <sup>s</sup> .9	58 <sup>s</sup> .06	64 <sup>s</sup> .8	26 <sup>s</sup> .77	34 <sup>s</sup> .2
11	40 <sup>s</sup> .20	75 <sup>s</sup> .3	58 <sup>s</sup> .34	66 <sup>s</sup> .1	27 <sup>s</sup> .08	32 <sup>s</sup> .0
21	40 <sup>s</sup> .50	73 <sup>s</sup> .6	58 <sup>s</sup> .64	67 <sup>s</sup> .6	27 <sup>s</sup> .41	29 <sup>s</sup> .9
31	40 <sup>s</sup> .82	71 <sup>s</sup> .8	58 <sup>s</sup> .95	69 <sup>s</sup> .4	27 <sup>s</sup> .76	28 <sup>s</sup> .0
	0 <sup>s</sup> .31	2 <sup>s</sup> .0	0 <sup>s</sup> .31	2 <sup>s</sup> .0	0 <sup>s</sup> .35	1 <sup>s</sup> .8
June 10	41 <sup>s</sup> .13	69 <sup>s</sup> .8	59 <sup>s</sup> .26	71 <sup>s</sup> .4	28 <sup>s</sup> .11	26 <sup>s</sup> .2
20	41 <sup>s</sup> .43	67 <sup>s</sup> .9	59 <sup>s</sup> .57	73 <sup>s</sup> .5	28 <sup>s</sup> .46	24 <sup>s</sup> .8
30	41 <sup>s</sup> .72	66 <sup>s</sup> .0	59 <sup>s</sup> .86	75 <sup>s</sup> .7	28 <sup>s</sup> .80	23 <sup>s</sup> .6
July 10	41 <sup>s</sup> .99	64 <sup>s</sup> .1	60 <sup>s</sup> .13	77 <sup>s</sup> .8	29 <sup>s</sup> .12	22 <sup>s</sup> .7
	0 <sup>s</sup> .24	1 <sup>s</sup> .7	0 <sup>s</sup> .24	2 <sup>s</sup> .2	0 <sup>s</sup> .30	0 <sup>s</sup> .5
20	42 <sup>s</sup> .23	62 <sup>s</sup> .4	60 <sup>s</sup> .37	80 <sup>s</sup> .0	29 <sup>s</sup> .42	22 <sup>s</sup> .2
30	42 <sup>s</sup> .43	60 <sup>s</sup> .8	60 <sup>s</sup> .57	82 <sup>s</sup> .0	29 <sup>s</sup> .68	22 <sup>s</sup> .0
Aug. 9	42 <sup>s</sup> .60	59 <sup>s</sup> .5	60 <sup>s</sup> .74	83 <sup>s</sup> .9	29 <sup>s</sup> .89	22 <sup>s</sup> .1
19	42 <sup>s</sup> .73	58 <sup>s</sup> .4	60 <sup>s</sup> .87	85 <sup>s</sup> .7	30 <sup>s</sup> .06	22 <sup>s</sup> .6
	0 <sup>s</sup> .08	0 <sup>s</sup> .9	0 <sup>s</sup> .08	1 <sup>s</sup> .6	0 <sup>s</sup> .13	0 <sup>s</sup> .8
29	42 <sup>s</sup> .81	57 <sup>s</sup> .5	60 <sup>s</sup> .95	87 <sup>s</sup> .3	30 <sup>s</sup> .19	23 <sup>s</sup> .4
Sept. 8	42 <sup>s</sup> .85	56 <sup>s</sup> .8	60 <sup>s</sup> .99	88 <sup>s</sup> .6	30 <sup>s</sup> .26	24 <sup>s</sup> .4
18	42 <sup>s</sup> .84	56 <sup>s</sup> .3	60 <sup>s</sup> .99	89 <sup>s</sup> .7	30 <sup>s</sup> .28	25 <sup>s</sup> .6
28	42 <sup>s</sup> .81	56 <sup>s</sup> .1	60 <sup>s</sup> .96	90 <sup>s</sup> .6	30 <sup>s</sup> .26	27 <sup>s</sup> .0
	0 <sup>s</sup> .07	0 <sup>s</sup> .0	0 <sup>s</sup> .06	0 <sup>s</sup> .6	0 <sup>s</sup> .06	1 <sup>s</sup> .5
Oct. 8	42 <sup>s</sup> .74	56 <sup>s</sup> .1	60 <sup>s</sup> .90	91 <sup>s</sup> .2	30 <sup>s</sup> .20	28 <sup>s</sup> .5
18	42 <sup>s</sup> .65	56 <sup>s</sup> .2	60 <sup>s</sup> .81	91 <sup>s</sup> .6	30 <sup>s</sup> .11	29 <sup>s</sup> .9
28	42 <sup>s</sup> .54	56 <sup>s</sup> .5	60 <sup>s</sup> .69	91 <sup>s</sup> .7	29 <sup>s</sup> .99	31 <sup>s</sup> .3
Nov. 7	42 <sup>s</sup> .41	56 <sup>s</sup> .9	60 <sup>s</sup> .56	91 <sup>s</sup> .6	29 <sup>s</sup> .85	32 <sup>s</sup> .6
	0 <sup>s</sup> .12	0 <sup>s</sup> .5	0 <sup>s</sup> .12	0 <sup>s</sup> .3	0 <sup>s</sup> .15	1 <sup>s</sup> .1
17	42 <sup>s</sup> .29	57 <sup>s</sup> .4	60 <sup>s</sup> .44	91 <sup>s</sup> .3	29 <sup>s</sup> .70	33 <sup>s</sup> .7
27	42 <sup>s</sup> .16	58 <sup>s</sup> .1	60 <sup>s</sup> .31	90 <sup>s</sup> .8	29 <sup>s</sup> .55	34 <sup>s</sup> .6
Dec. 7	42 <sup>s</sup> .04	58 <sup>s</sup> .8	60 <sup>s</sup> .18	90 <sup>s</sup> .1	29 <sup>s</sup> .40	35 <sup>s</sup> .2
17	41 <sup>s</sup> .93	59 <sup>s</sup> .6	60 <sup>s</sup> .06	89 <sup>s</sup> .3	29 <sup>s</sup> .27	35 <sup>s</sup> .5
	0 <sup>s</sup> .09	0 <sup>s</sup> .8	0 <sup>s</sup> .10	1 <sup>s</sup> .0	0 <sup>s</sup> .12	0 <sup>s</sup> .1
27	41 <sup>s</sup> .84	60 <sup>s</sup> .4	59 <sup>s</sup> .96	88 <sup>s</sup> .3	29 <sup>s</sup> .15	35 <sup>s</sup> .6
37	41 <sup>s</sup> .76	61 <sup>s</sup> .2	59 <sup>s</sup> .87	87 <sup>s</sup> .2	29 <sup>s</sup> .04	35 <sup>s</sup> .4



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\alpha$ Pegasi. (Markab)			$\gamma$ Piscium.			$\kappa$ Piscium.		
	R. A.	Dec. North.		R. A.	Dec. North.		R. A.	Dec. North.	
	<sup>h</sup> 22 <sup>m</sup> 58	<sup>°</sup> 14 <sup>'</sup> 30		<sup>h</sup> 23 <sup>m</sup> 10	<sup>°</sup> 2 <sup>'</sup> 34		<sup>h</sup> 23 <sup>m</sup> 20	<sup>°</sup> 0 <sup>'</sup> 32	
Jan. 1	15 <sup>s</sup> .75 0 <sup>s</sup> .10	21 <sup>s</sup> .9 1 <sup>s</sup> .2		24 <sup>s</sup> .13 0 <sup>s</sup> .09	15 <sup>s</sup> .1 0 <sup>s</sup> .9		14 <sup>s</sup> .73 0 <sup>s</sup> .09	33 <sup>s</sup> .0 0 <sup>s</sup> .8	
11	15 <sup>s</sup> .65 0 <sup>s</sup> .08	20 <sup>s</sup> .7 1 <sup>s</sup> .3		24 <sup>s</sup> .04 0 <sup>s</sup> .08	14 <sup>s</sup> .2 0 <sup>s</sup> .8		14 <sup>s</sup> .64 0 <sup>s</sup> .08	32 <sup>s</sup> .2 0 <sup>s</sup> .7	
21	15 <sup>s</sup> .57 0 <sup>s</sup> .05	19 <sup>s</sup> .4 1 <sup>s</sup> .4		23 <sup>s</sup> .96 0 <sup>s</sup> .05	13 <sup>s</sup> .4 0 <sup>s</sup> .8		14 <sup>s</sup> .56 0 <sup>s</sup> .07	31 <sup>s</sup> .5 0 <sup>s</sup> .7	
31	15 <sup>s</sup> .52 0 <sup>s</sup> .03	18 <sup>s</sup> .0 1 <sup>s</sup> .3		23 <sup>s</sup> .91 0 <sup>s</sup> .03	12 <sup>s</sup> .6 0 <sup>s</sup> .7		14 <sup>s</sup> .49 0 <sup>s</sup> .04	30 <sup>s</sup> .8 0 <sup>s</sup> .6	
Feb. 10	15 <sup>s</sup> .49 0 <sup>s</sup> .01	16 <sup>s</sup> .7 1 <sup>s</sup> .2		23 <sup>s</sup> .88 0 <sup>s</sup> .01	11 <sup>s</sup> .9 0 <sup>s</sup> .5		14 <sup>s</sup> .45 0 <sup>s</sup> .02	30 <sup>s</sup> .2 0 <sup>s</sup> .4	
20	15 <sup>s</sup> .48 0 <sup>s</sup> .03	15 <sup>s</sup> .5 1 <sup>s</sup> .1		23 <sup>s</sup> .87 0 <sup>s</sup> .03	11 <sup>s</sup> .4 0 <sup>s</sup> .4		14 <sup>s</sup> .43 0 <sup>s</sup> .02	29 <sup>s</sup> .8 0 <sup>s</sup> .2	
Mar. 2	15 <sup>s</sup> .51 0 <sup>s</sup> .08	14 <sup>s</sup> .4 1 <sup>s</sup> .0		23 <sup>s</sup> .90 0 <sup>s</sup> .06	11 <sup>s</sup> .0 0 <sup>s</sup> .2		14 <sup>s</sup> .45 0 <sup>s</sup> .05	29 <sup>s</sup> .6 0 <sup>s</sup> .0	
12	15 <sup>s</sup> .59 0 <sup>s</sup> .10	13 <sup>s</sup> .4 0 <sup>s</sup> .6		23 <sup>s</sup> .96 0 <sup>s</sup> .10	10 <sup>s</sup> .8 0 <sup>s</sup> .1		14 <sup>s</sup> .50 0 <sup>s</sup> .09	29 <sup>s</sup> .6 0 <sup>s</sup> .2	
22	15 <sup>s</sup> .69 0 <sup>s</sup> .15	12 <sup>s</sup> .8 0 <sup>s</sup> .3		24 <sup>s</sup> .06 0 <sup>s</sup> .13	10 <sup>s</sup> .9 0 <sup>s</sup> .4		14 <sup>s</sup> .59 0 <sup>s</sup> .12	29 <sup>s</sup> .8 0 <sup>s</sup> .5	
Apr. 1	15 <sup>s</sup> .84 0 <sup>s</sup> .18	12 <sup>s</sup> .5 0 <sup>s</sup> .1		24 <sup>s</sup> .19 0 <sup>s</sup> .17	11 <sup>s</sup> .3 0 <sup>s</sup> .7		14 <sup>s</sup> .71 0 <sup>s</sup> .16	30 <sup>s</sup> .3 0 <sup>s</sup> .7	
11	16 <sup>s</sup> .02 0 <sup>s</sup> .22	12 <sup>s</sup> .6 0 <sup>s</sup> .3		24 <sup>s</sup> .36 0 <sup>s</sup> .21	12 <sup>s</sup> .0 0 <sup>s</sup> .9		14 <sup>s</sup> .87 0 <sup>s</sup> .19	31 <sup>s</sup> .0 1 <sup>s</sup> .1	
21	16 <sup>s</sup> .24 0 <sup>s</sup> .25	12 <sup>s</sup> .9 0 <sup>s</sup> .8		24 <sup>s</sup> .57 0 <sup>s</sup> .23	12 <sup>s</sup> .9 1 <sup>s</sup> .2		15 <sup>s</sup> .06 0 <sup>s</sup> .23	32 <sup>s</sup> .1 1 <sup>s</sup> .3	
May 1	16 <sup>s</sup> .49 0 <sup>s</sup> .27	13 <sup>s</sup> .7 1 <sup>s</sup> .1		24 <sup>s</sup> .80 0 <sup>s</sup> .27	14 <sup>s</sup> .1 1 <sup>s</sup> .5		15 <sup>s</sup> .29 0 <sup>s</sup> .26	33 <sup>s</sup> .4 1 <sup>s</sup> .5	
11	16 <sup>s</sup> .76 0 <sup>s</sup> .30	14 <sup>s</sup> .8 1 <sup>s</sup> .4		25 <sup>s</sup> .07 0 <sup>s</sup> .29	15 <sup>s</sup> .6 1 <sup>s</sup> .7		15 <sup>s</sup> .55 0 <sup>s</sup> .29	34 <sup>s</sup> .9 1 <sup>s</sup> .7	
21	17 <sup>s</sup> .06 0 <sup>s</sup> .31	16 <sup>s</sup> .2 1 <sup>s</sup> .6		25 <sup>s</sup> .36 0 <sup>s</sup> .30	17 <sup>s</sup> .3 1 <sup>s</sup> .8		15 <sup>s</sup> .84 0 <sup>s</sup> .30	36 <sup>s</sup> .6 1 <sup>s</sup> .8	
31	17 <sup>s</sup> .37 0 <sup>s</sup> .32	17 <sup>s</sup> .8 1 <sup>s</sup> .9		25 <sup>s</sup> .66 0 <sup>s</sup> .31	19 <sup>s</sup> .1 1 <sup>s</sup> .9		16 <sup>s</sup> .14 0 <sup>s</sup> .31	38 <sup>s</sup> .4 1 <sup>s</sup> .9	
June 10	17 <sup>s</sup> .69 0 <sup>s</sup> .31	19 <sup>s</sup> .7 2 <sup>s</sup> .1		25 <sup>s</sup> .97 0 <sup>s</sup> .32	21 <sup>s</sup> .0 2 <sup>s</sup> .1		16 <sup>s</sup> .45 0 <sup>s</sup> .31	40 <sup>s</sup> .3 2 <sup>s</sup> .1	
20	18 <sup>s</sup> .00 0 <sup>s</sup> .30	21 <sup>s</sup> .8 2 <sup>s</sup> .2		26 <sup>s</sup> .29 0 <sup>s</sup> .30	23 <sup>s</sup> .1 2 <sup>s</sup> .0		16 <sup>s</sup> .76 0 <sup>s</sup> .31	42 <sup>s</sup> .4 2 <sup>s</sup> .1	
30	18 <sup>s</sup> .30 0 <sup>s</sup> .29	24 <sup>s</sup> .0 2 <sup>s</sup> .3		26 <sup>s</sup> .59 0 <sup>s</sup> .29	25 <sup>s</sup> .1 2 <sup>s</sup> .0		17 <sup>s</sup> .07 0 <sup>s</sup> .29	44 <sup>s</sup> .5 1 <sup>s</sup> .9	
July 10	18 <sup>s</sup> .59 0 <sup>s</sup> .26	26 <sup>s</sup> .3 2 <sup>s</sup> .3		26 <sup>s</sup> .88 0 <sup>s</sup> .27	27 <sup>s</sup> .1 1 <sup>s</sup> .9		17 <sup>s</sup> .36 0 <sup>s</sup> .27	46 <sup>s</sup> .4 1 <sup>s</sup> .9	
20	18 <sup>s</sup> .85 0 <sup>s</sup> .22	28 <sup>s</sup> .6 2 <sup>s</sup> .2		27 <sup>s</sup> .15 0 <sup>s</sup> .23	29 <sup>s</sup> .0 1 <sup>s</sup> .8		17 <sup>s</sup> .63 0 <sup>s</sup> .24	48 <sup>s</sup> .3 1 <sup>s</sup> .7	
30	19 <sup>s</sup> .07 0 <sup>s</sup> .18	30 <sup>s</sup> .8 2 <sup>s</sup> .1		27 <sup>s</sup> .38 0 <sup>s</sup> .20	30 <sup>s</sup> .8 1 <sup>s</sup> .6		17 <sup>s</sup> .87 0 <sup>s</sup> .21	50 <sup>s</sup> .0 1 <sup>s</sup> .5	
Aug. 9	19 <sup>s</sup> .25 0 <sup>s</sup> .15	32 <sup>s</sup> .9 2 <sup>s</sup> .0		27 <sup>s</sup> .58 0 <sup>s</sup> .17	32 <sup>s</sup> .4 1 <sup>s</sup> .4		18 <sup>s</sup> .08 0 <sup>s</sup> .17	51 <sup>s</sup> .5 1 <sup>s</sup> .3	
19	19 <sup>s</sup> .40 0 <sup>s</sup> .11	34 <sup>s</sup> .9 1 <sup>s</sup> .8		27 <sup>s</sup> .75 0 <sup>s</sup> .12	33 <sup>s</sup> .8 1 <sup>s</sup> .1		18 <sup>s</sup> .25 0 <sup>s</sup> .13	52 <sup>s</sup> .8 1 <sup>s</sup> .0	
29	19 <sup>s</sup> .51 0 <sup>s</sup> .06	36 <sup>s</sup> .7 1 <sup>s</sup> .7		27 <sup>s</sup> .87 0 <sup>s</sup> .08	34 <sup>s</sup> .9 1 <sup>s</sup> .0		18 <sup>s</sup> .38 0 <sup>s</sup> .09	53 <sup>s</sup> .8 0 <sup>s</sup> .9	
Sept. 8	19 <sup>s</sup> .57 0 <sup>s</sup> .02	38 <sup>s</sup> .4 1 <sup>s</sup> .3		27 <sup>s</sup> .95 0 <sup>s</sup> .04	35 <sup>s</sup> .9 0 <sup>s</sup> .7		18 <sup>s</sup> .47 0 <sup>s</sup> .05	54 <sup>s</sup> .7 0 <sup>s</sup> .6	
18	19 <sup>s</sup> .59 0 <sup>s</sup> .01	39 <sup>s</sup> .7 1 <sup>s</sup> .2		27 <sup>s</sup> .99 0 <sup>s</sup> .00	36 <sup>s</sup> .6 0 <sup>s</sup> .4		18 <sup>s</sup> .52 0 <sup>s</sup> .02	55 <sup>s</sup> .3 0 <sup>s</sup> .3	
28	19 <sup>s</sup> .58 0 <sup>s</sup> .05	40 <sup>s</sup> .9 0 <sup>s</sup> .9		27 <sup>s</sup> .99 0 <sup>s</sup> .03	37 <sup>s</sup> .0 0 <sup>s</sup> .3		18 <sup>s</sup> .54 0 <sup>s</sup> .02	55 <sup>s</sup> .6 0 <sup>s</sup> .1	
Oct. 8	19 <sup>s</sup> .53 0 <sup>s</sup> .07	41 <sup>s</sup> .8 0 <sup>s</sup> .6		27 <sup>s</sup> .96 0 <sup>s</sup> .05	37 <sup>s</sup> .3 0 <sup>s</sup> .1		18 <sup>s</sup> .52 0 <sup>s</sup> .05	55 <sup>s</sup> .7 0 <sup>s</sup> .0	
18	19 <sup>s</sup> .46 0 <sup>s</sup> .10	42 <sup>s</sup> .4 0 <sup>s</sup> .4		27 <sup>s</sup> .91 0 <sup>s</sup> .08	37 <sup>s</sup> .4 0 <sup>s</sup> .2		18 <sup>s</sup> .47 0 <sup>s</sup> .08	55 <sup>s</sup> .7 0 <sup>s</sup> .2	
28	19 <sup>s</sup> .36 0 <sup>s</sup> .11	42 <sup>s</sup> .8 0 <sup>s</sup> .2		27 <sup>s</sup> .83 0 <sup>s</sup> .10	37 <sup>s</sup> .2 0 <sup>s</sup> .3		18 <sup>s</sup> .39 0 <sup>s</sup> .09	55 <sup>s</sup> .5 0 <sup>s</sup> .4	
Nov. 7	19 <sup>s</sup> .25 0 <sup>s</sup> .13	43 <sup>s</sup> .0 0 <sup>s</sup> .1		27 <sup>s</sup> .73 0 <sup>s</sup> .11	36 <sup>s</sup> .9 0 <sup>s</sup> .4		18 <sup>s</sup> .30 0 <sup>s</sup> .10	55 <sup>s</sup> .1 0 <sup>s</sup> .5	
17	19 <sup>s</sup> .12 0 <sup>s</sup> .12	42 <sup>s</sup> .9 0 <sup>s</sup> .3		27 <sup>s</sup> .62 0 <sup>s</sup> .12	36 <sup>s</sup> .5 0 <sup>s</sup> .6		18 <sup>s</sup> .20 0 <sup>s</sup> .12	54 <sup>s</sup> .6 0 <sup>s</sup> .6	
27	19 <sup>s</sup> .00 0 <sup>s</sup> .13	42 <sup>s</sup> .6 0 <sup>s</sup> .6		27 <sup>s</sup> .50 0 <sup>s</sup> .11	35 <sup>s</sup> .9 0 <sup>s</sup> .7		18 <sup>s</sup> .08 0 <sup>s</sup> .11	54 <sup>s</sup> .0 0 <sup>s</sup> .7	
Dec. 7	18 <sup>s</sup> .87 0 <sup>s</sup> .13	42 <sup>s</sup> .0 0 <sup>s</sup> .8		27 <sup>s</sup> .39 0 <sup>s</sup> .12	35 <sup>s</sup> .2 0 <sup>s</sup> .7		17 <sup>s</sup> .97 0 <sup>s</sup> .12	53 <sup>s</sup> .3 0 <sup>s</sup> .8	
17	18 <sup>s</sup> .74 0 <sup>s</sup> .11	41 <sup>s</sup> .2 1 <sup>s</sup> .0		27 <sup>s</sup> .27 0 <sup>s</sup> .10	34 <sup>s</sup> .5 0 <sup>s</sup> .8		17 <sup>s</sup> .85 0 <sup>s</sup> .11	52 <sup>s</sup> .5 0 <sup>s</sup> .7	
27	18 <sup>s</sup> .63 0 <sup>s</sup> .10	40 <sup>s</sup> .2 1 <sup>s</sup> .1		27 <sup>s</sup> .17 0 <sup>s</sup> .10	33 <sup>s</sup> .7 0 <sup>s</sup> .8		17 <sup>s</sup> .74 0 <sup>s</sup> .10	51 <sup>s</sup> .8 0 <sup>s</sup> .8	
37	18 <sup>s</sup> .53	39 <sup>s</sup> .1		27 <sup>s</sup> .07	32 <sup>s</sup> .9		17 <sup>s</sup> .64	51 <sup>s</sup> .0	



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	♈ Piscium.		γ Cephei.	
	R. A.	Dec. North.	R. A.	Dec. North.
	<sup>h</sup> 23	<sup>°</sup> 4	<sup>h</sup> 23	<sup>°</sup> 76
Jan. 1	<sup>m</sup> 33 <sup>s</sup> 14.61 <sup>s</sup> 0.10	<sup>'</sup> 55 <sup>"</sup> 13.4 <sup>"</sup> 0.9	<sup>m</sup> 34 <sup>s</sup> 59.85 <sup>s</sup> 0.87	<sup>'</sup> 54 <sup>"</sup> 38.3 <sup>"</sup> 1.0
11	14.51 0.09	12.5 0.8	33 59.98 0.81	37.3 1.6
21	14.42 0.08	11.7 0.9	59.17 0.71	35.7 2.0
31	14.34 0.05	10.8 0.7	58.46 0.59	33.7 2.5
Feb. 10	14.29 0.03	10.1 0.7	57.87 0.45	31.2 2.9
20	14.26 0.00	9.4 0.5	57.42 0.28	28.3 3.1
Mar. 2	14.26 0.03	8.9 0.3	57.14 0.10	25.2 3.2
12	{14.2} 0.07	{8.6} 0.0	57.04 0.09	22.0 3.4
22	14.37 0.11	8.6 0.2	57.13 0.27	18.6 2.9
Apr. 1	14.48 0.15	8.8 0.5	57.40 0.44	15.7 2.6
11	14.63 0.19	9.3 0.8	57.84 0.60	13.1 2.3
21	14.82 0.22	10.1 1.1	58.44 0.74	10.8 1.8
May 1	15.04 0.25	11.2 1.3	33 59.18 0.84	9.0 1.3
11	15.29 0.28	12.5 1.6	34 0.02 0.92	7.7 0.7
21	15.57 0.30	14.1 1.8	0.94 0.97	7.0 0.1
31	15.87 0.31	15.9 1.9	1.91 1.00	6.9 0.5
June 10	16.18 0.31	17.8 2.0	2.91 0.99	7.4 1.0
20	16.49 0.31	19.8 2.1	3.90 0.95	8.4 1.6
30	16.80 0.30	21.9 2.0	4.85 0.88	10.0 2.1
July 10	17.10 0.28	23.9 2.0	5.73 0.81	12.1 2.4
20	17.38 0.25	25.9 1.8	6.54 0.70	14.5 2.9
30	17.63 0.21	27.7 1.7	7.24 0.59	17.4 3.3
Aug. 9	17.84 0.18	29.4 1.6	7.83 0.46	20.7 3.5
19	18.02 0.15	31.0 1.3	8.29 0.33	24.2 3.6
29	18.17 0.10	32.3 1.0	8.62 0.18	27.8 3.8
Sept. 8	18.27 0.06	33.3 0.9	8.80 0.03	31.6 3.7
18	18.33 0.03	34.2 0.7	8.83 0.11	35.3 3.8
28	18.36 0.01	34.9 0.4	8.72 0.24	39.1 3.6
Oct. 8	18.35 0.04	35.3 0.1	8.48 0.38	42.7 3.3
18	18.31 0.06	35.4 0.0	8.10 0.51	46.0 3.1
28	18.25 0.08	35.4 0.2	7.59 0.61	49.1 2.7
Nov. 7	18.17 0.10	35.2 0.4	6.98 0.72	51.8 2.3
17	18.07 0.11	34.8 0.5	6.26 0.80	54.1 1.7
27	17.96 0.11	34.3 0.6	5.46 0.86	55.8 1.2
Dec. 7	17.85 0.12	33.7 0.7	4.60 0.90	57.0 0.6
17	17.73 0.11	33.0 0.8	3.70 0.91	57.6 0.0
27	17.62 0.10	32.2 0.8	2.79 0.89	57.6 0.7
37	33 17.52	55 31.4	34 1.90	54 56.9



## APPARENT PLACES, FOR THE UPPER TRANSIT AT GREENWICH.

Month and Day.	$\delta$ Sculptoris.			$\omega$ Piscium.		
	R. A.		Dec. South.	R. A.		Dec. North.
	<sup>h</sup> 23	<sup>m</sup> 42	<sup>s</sup> 7.53	<sup>h</sup> 23	<sup>m</sup> 52	<sup>s</sup> 37.06
Jan. 1	7.53	0.13	51 11.6	37.06	0.11	8 31.8
11	7.40	0.11	11.6	36.95	0.10	31.0
21	7.29	0.09	11.2	36.85	0.09	30.1
31	7.20	0.07	10.6	36.76	0.07	29.3
Feb. 10	7.13	0.04	9.6	36.69	0.05	28.5
20	7.09	0.00	8.4	36.64	0.02	27.8
Mar. 2	7.09	0.02	6.9	36.62	0.02	27.3
12	7.11	0.07	5.1	36.64	0.06	27.0
Apr. 22	7.18	0.11	2.9	36.70	0.09	26.9
1	7.29	0.15	51 0.7	36.79	0.12	27.0
11	7.44	0.20	50 58.4	36.91	0.17	27.5
21	7.64	0.23	56.0	37.08	0.21	28.2
May 1	7.87	0.27	53.5	37.29	0.24	29.2
11	8.14	0.29	51.1	37.53	0.27	30.5
21	8.43	0.32	48.7	37.80	0.29	32.0
31	8.75	0.34	46.4	38.09	0.31	33.7
June 10	9.09	0.35	44.3	38.40	0.31	35.6
20	9.44	0.35	42.4	38.71	0.32	37.6
30	9.79	0.33	40.8	39.03	0.30	39.7
July 10	10.12	0.32	39.5	39.33	0.28	41.7
20	10.44	0.29	38.5	39.61	0.26	43.7
30	10.73	0.26	37.9	39.87	0.23	45.6
Aug. 9	10.99	0.22	37.7	40.10	0.20	47.4
19	11.21	0.17	37.9	40.30	0.16	49.1
Sept. 29	11.38	0.12	38.4	40.46	0.12	50.5
8	11.50	0.08	39.3	40.58	0.08	51.6
18	11.58	0.04	40.4	40.66	0.05	52.6
28	11.62	0.01	41.7	40.71	0.01	53.3
Oct. 8	11.61	0.04	43.2	40.72	0.02	53.8
18	11.57	0.08	44.8	40.70	0.05	54.0
28	11.49	0.10	46.4	40.65	0.07	54.1
Nov. 7	11.39	0.12	47.9	40.58	0.08	54.0
17	11.27	0.13	49.3	40.50	0.10	53.7
27	11.14	0.14	50.5	40.40	0.11	53.2
Dec. 7	11.00	0.14	51.5	40.29	0.11	52.7
17	10.86	0.14	52.2	40.18	0.12	52.0
27	10.72	0.13	52.6	40.06	0.11	51.3
37	10.59	0.13	50 52.7	39.95	0.11	50.5



## TABLE,

Showing the *Correction* to be applied to the *preceding* Apparent Places of Five Polar Stars, for the terms of Nutation involving 2 ( .

Arg.	α Urs. Min.		51 Cephei.		σ Octantis.		δ Urs. Min.		λ Urs. Min.		Arg.		
°	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	°		
0	180	— 235	+ 03	+ 021	+ 09	+ 013	— 09	— 007	— 09	— 150	— 08	90	270
1	181	237	02	017	09	003	09	004	09	142	08	91	271
2	182	239	02	012	09	019	09	— 001	09	134	08	92	272
3	183	242	02	008	09	033	09	+ 002	09	125	08	93	273
4	184	244	01	+ 004	09	047	09	005	09	116	08	94	274
5	185	245	01	— 001	09	063	09	008	09	107	08	95	275
6	186	247	+ 01	006	09	078	08	010	09	097	08	96	276
7	187	248	00	010	09	093	08	013	09	088	08	97	277
8	188	248	00	014	09	108	08	015	09	078	08	98	278
9	189	248	00	018	09	123	08	018	09	069	08	99	279
10	190	248	00	022	09	137	08	021	09	060	09	100	280
11	191	248	— 01	027	09	152	08	023	09	050	09	101	281
12	192	247	01	031	09	166	08	026	09	040	09	102	282
13	193	246	01	035	08	180	08	028	08	031	09	103	283
14	194	244	02	039	08	193	08	031	08	021	09	104	284
15	195	243	02	043	08	207	08	034	08	011	09	105	285
16	196	241	02	047	08	220	07	036	08	— 002	09	106	286
17	197	239	02	051	08	233	07	038	08	+ 008	09	107	287
18	198	237	03	054	08	246	07	040	08	018	09	108	288
19	199	234	03	058	08	258	07	043	08	028	09	109	289
20	200	231	03	063	08	270	07	046	07	038	09	110	290
21	201	228	03	067	07	282	07	048	07	048	09	111	291
22	202	224	04	071	07	293	07	050	07	057	09	112	292
23	203	220	04	074	07	305	07	052	07	067	09	113	293
24	204	216	04	077	07	316	07	054	07	077	08	114	294
25	205	212	04	080	07	326	06	056	06	087	08	115	295
26	206	208	05	083	06	336	06	058	06	096	08	116	296
27	207	204	05	086	06	346	06	059	06	104	08	117	297
28	208	198	05	090	06	355	05	061	06	113	08	118	298
29	209	193	05	093	05	364	05	063	06	122	08	119	299
30	210	187	05	096	05	372	05	065	05	131	08	120	300
31	211	181	06	099	05	379	05	066	05	140	08	121	301
32	212	176	06	102	05	387	04	067	05	149	08	122	302
33	213	170	06	104	04	394	04	069	04	157	07	123	303
34	214	163	06	106	04	400	04	071	04	165	07	124	304
35	215	156	06	108	04	406	04	072	04	173	07	125	305
36	216	149	07	110	04	412	03	073	04	180	07	126	306
37	217	141	07	113	03	417	03	074	03	187	06	127	307
38	218	134	07	115	03	421	03	075	03	194	06	128	308
39	219	127	07	116	03	425	03	076	03	201	06	129	309
40	220	121	07	117	03	428	02	077	02	208	06	130	310
41	221	114	07	118	02	431	02	078	02	214	05	131	311
42	222	106	08	119	02	433	02	078	02	221	05	132	312
43	223	098	08	120	01	435	02	078	02	227	05	133	313
44	224	090	08	121	01	436	01	078	01	233	05	134	314
45	225	— 081	— 08	— 122	+ 01	— 437	— 01	+ 078	— 01	+ 238	— 04	135	315

NOTE.—When the *Argument* is on the *right-hand* side of the Table, the sign of the correction must be changed.



TABLE,

Showing the *Correction* to be applied to the *preceding* Apparent Places of Five Polar Stars, for the terms of Nutation involving 2 (.

Arg.		$\alpha$ Urs. Min.		51 Cephei.		$\sigma$ Octantis.		$\delta$ Urs. Min.		$\lambda$ Urs. Min.		Arg.	
(		R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	)	
45	225	—'081	—'08	—'122	+ '01	—'437	—'01	+ '078	—'01	+ '238	—'04	135	315
46	226	'073	'08	'123	'00	'437	'00	'078	—'01	'243	'04	136	316
47	227	'064	'08	'124	'00	'437	'00	'079	'00	'248	'04	137	317
48	228	'056	'08	'124	'00	'436	'00	'079	'00	'252	'04	138	318
49	229	'048	'08	'124	—'01	'435	+ '01	'078	'00	'256	'04	139	319
50	230	'040	'08	'124	'01	'432	'01	'078	+ '01	'260	'03	140	320
51	231	'031	'08	'124	'01	'429	'01	'078	'01	'264	'03	141	321
52	232	'022	'08	'123	'02	'426	'02	'078	'01	'267	'03	142	322
53	233	'013	'08	'123	'02	'423	'02	'077	'02	'270	'02	143	323
54	234	—'004	'08	'123	'02	'420	'02	'077	'02	'272	'02	144	324
55	235	+ '004	'08	'122	'02	'415	'03	'076	'02	'275	'02	145	325
56	236	'012	'08	'122	'03	'410	'03	'075	'03	'277	'02	146	326
57	237	'021	'08	'121	'03	'405	'03	'074	'03	'278	'01	147	327
58	238	'030	'08	'119	'03	'399	'03	'073	'03	'279	'01	148	328
59	239	'039	'08	'117	'04	'392	'04	'072	'03	'280	—'01	149	329
60	240	'048	'08	'116	'04	'385	'04	'071	'04	'281	'00	150	330
61	241	'056	'08	'115	'04	'377	'04	'070	'04	'281	'00	151	331
62	242	'064	'08	'113	'04	'369	'04	'069	'04	'281	'00	152	332
63	243	'072	'08	'111	'05	'361	'05	'067	'05	'280	+ '01	153	333
64	244	'080	'08	'109	'05	'352	'05	'066	'05	'279	'01	154	334
65	245	'088	'08	'107	'05	'343	'05	'064	'05	'279	'01	155	335
66	246	'096	'07	'104	'06	'333	'05	'062	'05	'278	'02	156	336
67	247	'104	'07	'102	'06	'323	'05	'061	'06	'276	'02	157	337
68	248	'112	'07	'100	'06	'312	'06	'060	'06	'274	'02	158	338
69	249	'120	'07	'097	'06	'301	'06	'058	'06	'271	'02	159	339
70	250	'127	'07	'095	'06	'291	'06	'056	'06	'267	'03	160	340
71	251	'134	'07	'092	'07	'280	'06	'054	'06	'264	'03	161	341
72	252	'142	'07	'089	'07	'268	'07	'052	'07	'261	'03	162	342
73	253	'149	'06	'086	'07	'255	'07	'050	'07	'257	'04	163	343
74	254	'156	'06	'082	'07	'242	'07	'048	'07	'253	'04	164	344
75	255	'163	'06	'079	'07	'230	'07	'046	'07	'249	'04	165	345
76	256	'169	'06	'076	'08	'217	'07	'044	'08	'245	'04	166	346
77	257	'175	'06	'072	'08	'203	'08	'042	'08	'240	'05	167	347
78	258	'181	'05	'069	'08	'189	'08	'039	'08	'234	'05	168	348
79	259	'187	'05	'065	'08	'175	'08	'036	'08	'229	'05	169	349
80	260	'192	'05	'062	'08	'161	'08	'033	'08	'223	'06	170	350
81	261	'198	'05	'058	'08	'147	'08	'030	'08	'216	'06	171	351
82	262	'203	'04	'054	'08	'132	'08	'028	'08	'210	'06	172	352
83	263	'208	'04	'050	'09	'118	'08	'025	'08	'204	'06	173	353
84	264	'212	'04	'046	'09	'103	'08	'022	'09	'197	'06	174	354
85	265	'217	'04	'042	'09	'088	'08	'020	'09	'190	'07	175	355
86	266	'221	'03	'038	'09	'073	'09	'018	'09	'182	'07	176	356
87	267	'225	'03	'033	'09	'058	'09	'015	'09	'174	'07	177	357
88	268	'228	'03	'029	'09	'043	'09	'012	'09	'167	'07	178	358
89	269	'231	'03	'025	'09	'028	'09	'009	'09	'159	'07	179	359
90	270	+ '235	—'03	—'021	—'09	—'013	+ '09	+ '007	+ '09	+ '150	+ '08	180	360

NOTE.—When the *Argument* is on the *right-hand* side of the Table, the sign of the correction must be changed.



# 90 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.				
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.
Jan. 1	Moon II. L.	- -	<sup>h</sup> 18 <sup>m</sup> 50 <sup>s</sup> 20·97	<sup>s</sup> 151·22	<sup>s</sup> 70·55	S. 21° 25' 36·6	- 6·1
2	Moon I. U.	0·5	19 18 3·83	149·24	70·06	S. 21 16 46·4	+ 93·6
	Moon I. L.	- -	19 47 38·63	146·44	69·38	20 48 31·5	187·7
3	Moon I. U.	1·5	20 16 36·14	143·06	68·56	S. 20 2 11·1	+ 274·3
	Moon I. L.	- -	20 44 50·50	139·29	67·64	18 59 24·2	352·0
4	Moon I. U.	2·6	21 12 18·27	135·33	66·66	S. 17 42 1·2	+ 420·2
	Moon I. L.	- -	21 38 58·39	131·38	65·68	16 11 56·9	478·9
5	Moon I. U.	3·6	22 4 51·95	127·59	64·73	S. 14 31 5·0	+ 528·2
	Moon I. L.	- -	22 30 1·72	124·10	63·85	12 41 14·0	568·8
	♈ Aquarii -	4½	22 23 44·06			11 20	
	♈ Aquarii -	4	22 42 40·69			S. 14 16	
6	♈ Aquarii -	4½	22 23 44·06			S. 11 20	
	♈ Aquarii -	4	22 42 40·68			14 16	
	Moon I. U.	4·7	22 54 31·89	121·00	63·05	10 44 5·2	+ 601·4
	Moon I. L.	- -	23 18 27·63	118·37	62·37	8 41 10·9	626·5
	♏ Aquarii -	4½	23 7 33·88			6 45	
	♏ Aquarii -	4½	23 11 7·27			S. 9 53	
7	♏ Aquarii -	4½	23 7 33·87			S. 6 45	
	♏ Aquarii -	4½	23 11 7·26			9 53	
	Moon I. U.	5·7	23 41 54·84	116·25	61·83	6 33 55·0	+ 645·1
	Moon I. L.	- -	0 4 59·87	114·68	61·42	4 23 33·9	657·5
	27 Piscium -	5½	23 51 59·71			4 16	
	30 Piscium -	5	23 55 16·33			S. 6 44	
8	27 Piscium -	5½	23 51 59·70			S. 4 16	
	30 Piscium -	5	23 55 16·31			6 44	
	Moon I. U.	6·7	0 27 49·32	113·66	61·16	S. 2 11 16·7	+ 664·4
	Moon I. L.	- -	0 50 30·09	113·23	61·06	N. 0 1 51·3	666·0
	20 Ceti - - -	5½	0 46 21·07			S. 1 52	
	33 Ceti - - -	6	1 3 51·43			N. 1 45	
9	20 Ceti - - -	5½	0 46 21·06			S. 1 52	
	33 Ceti - - -	6	1 3 51·42			N. 1 45	
	Moon I. U.	7·8	1 13 9·08	113·37	61·10	2 14 48·0	+ 662·6
	Moon I. L.	- -	1 35 53·19	114·08	61·30	4 26 32·6	654·0
	♊ Piscium *	4½	1 34 39·34			4 50	
	♊ Piscium *	4	1 46 48·96			N. 2 33	
10	♊ Piscium *	4½	1 34 39·33			N. 4 50	
	♊ Piscium -	4	1 46 48·95			2 33	
	Moon I. U.	8·8	1 58 49·33	115·37	61·65	6 36 2·5	+ 640·1
	Moon I. L.	- -	2 22 4·24	117·21	62·15	8 42 12·0	620·5
	♋ Ceti - - *	4	2 21 14·52			7 53	
	♋ Ceti - - *	5	2 29 2·76			N. 5 2	
11	♋ Ceti - - *	4	2 21 14·51			N. 7 53	
	♋ Ceti - - *	5	2 29 2·75			5 2	
	Moon I. U.	9·8	2 45 44·45	119·58	62·78	10 43 50·6	+ 594·8
	Moon I. L.	- -	3 9 56·14	122·44	63·52	N. 12 39 41·0	+ 562·4



# MOON-CULMINATING STARS, 1870. 391

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	"	"	° ' "	"	"
Jan. 11	ξ Tauri - *	3½	3 20 7.44			N. 9 17		
	f Tauri - *	4	3 23 41.93			12 29		
12	ξ Tauri - *	3½	3 20 7.43			N. 9 17		
	f Tauri - *	4	3 23 41.92			12 29		
	Moon I. U.	10.8	3 34 44.83	125.74	64.37	14 28 18.5	+522.5	
	Moon I. L.	- -	4 0 15.29	129.39	65.30	16 8 9.5	474.6	
	λ Tauri - *	3½	3 53 28.84			12 7		
	γ Tauri - -	4	4 12 24.00			N. 15 19		
13	λ Tauri - *	3½	3 53 28.83			N. 12 7		
	γ Tauri - -	4	4 12 23.99			15 19		
	Moon I. U.	11.9	4 26 31.06	133.27	66.26	17 37 33.1	+417.9	
	Moon I. L.	- -	4 53 34.15	137.25	67.25	18 54 42.0	352.0	
	i Tauri - -	5½	4 43 46.49			18 37		
	i Tauri - -	5	4 55 19.93			N. 21 24		
14	i Tauri - -	5½	4 43 46.48			N. 18 37		
	i Tauri - -	5	4 55 19.93			21 24		
	Moon I. U.	12.9	5 21 24.66	141.14	68.19	19 57 45.6	+277.0	
	Moon I. L.	- -	5 50 0.41	144.75	69.06	20 44 55.1	193.1	
	χ' Orionis - -	4½	5 46 41.49			20 15		
	χ' Orionis - -	5	5 56 12.51			N. 20 8		
	χ' Orionis - -	4½	5 46 41.48			N. 20 15		
	χ' Orionis - -	5	5 56 12.51			20 8		
15	Moon I. U.	13.9	6 19 16.82	147.89	69.80	21 14 29.0	+101.3	
	Moon I. L.	- -	6 49 7.02	150.35	70.38	21 25 1.7	+ 3.2	
	ζ Geminor.	4	6 56 24.43			20 45		
	λ Geminor.	3½	7 10 37.90			N. 16 46		
	ζ Geminor.	4	6 56 24.44			N. 20 45		
	λ Geminor.	3½	7 10 37.90			16 46		
16	Moon I. U.	15.0	7 19 22.06	152.01	70.76	21 15 29.8	- 99.0	
	Moon I. L.	- -	7 49 51.76	152.79	70.94	20 45 19.2	202.7	
	κ Geminor.	3½	7 36 36.35			24 42		
	μ' Cancrī - -	5½	8 0 7.30			N. 21 57		
	κ Geminor.	3½	7 36 36.36			N. 24 42		
	μ' Cancrī - -	5½	8 0 7.32			21 57		
17	Moon II. U.	16.0	8 22 47.30	152.67	70.92	19 54 29.8	-305.0	
	δ Cancrī - -	4	8 37 18.24			18 38		
	83 Cancrī - -	6	9 11 43.67			N. 18 15		
	δ Cancrī - -	4	8 37 18.26			N. 18 38		
	83 Cancrī - -	6	9 11 43.69			18 15		
	Moon II. L.	- -	8 53 14.54	151.75	70.71	18 43 36.5	-402.9	
18	Moon II. U.	17.0	9 23 26.79	150.20	70.35	17 13 48.6	493.7	
	ν Leonis - *	5	9 51 14.03			13 4		
	α Leonis - *	1½	10 1 27.10			N. 12 36		
	ν Leonis - *	5	9 51 14.05			N. 13 4		
	α Leonis - *	1½	10 1 27.13			12 36		
	Moon II. L.	- -	9 53 17.61	148.22	69.89	N. 15 26 44.8	-575.2	



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
Jan. 19	Moon II. U.	18.1	h m s 10 22 43.07	146.01	69.38	N. 13 24 27.3	-645.7	
	l Leonis - *	5	10 42 25.51			11 14		
	x Leonis - *	5	10 58 18.76			N. 8 2		
20	l Leonis - *	5	10 42 25.53			N. 11 14		
	x Leonis - *	5	10 58 18.78			8 2		
	Moon II. L.	- -	10 51 41.66	143.77	68.86	11 9 15.9	-704.1	
	Moon II. U.	19.1	11 20 14.20	141.70	68.37	8 43 39.8	749.7	
	γ Virginis *	4½	11 39 10.84			7 15		
	π Virginis *	4½	11 54 12.69			N. 7 20		
21	γ Virginis *	4½	11 39 10.87			N. 7 15		
	π Virginis *	4½	11 54 12.72			7 20		
	Moon II. L.	- -	11 48 23.54	139.92	67.95	6 10 13.8	-782.4	
	Moon II. U.	20.1	12 16 13.91	138.55	67.64	N. 3 31 33.3	802.2	
	γ Virginis -	2½	12 35 4.21			S. 0 44		
	38 Virginis -	6	12 46 31.70			S. 2 51		
22	γ Virginis -	2½	12 35 4.24			S. 0 44		
	38 Virginis -	6	12 46 31.73			S. 2 51		
	Moon II. L.	- -	12 43 50.74	137.67	67.44	N. 0 50 11.1	-809.4	
	Moon II. U.	21.2	13 11 20.09	137.31	67.36	S. 1 51 23.6	804.3	
	ρ Virginis -	5	13 25 12.20			5 35		
	80 Virginis -	6	13 28 45.16			S. 4 44		
23	ρ Virginis -	5	13 25 12.23			S. 5 35		
	80 Virginis -	6	13 28 45.20			4 44		
	Moon II. L.	- -	13 38 48.23	137.47	67.41	4 30 45.8	-787.4	
	Moon II. U.	22.2	14 6 21.37	138.13	67.59	7 5 35.6	759.0	
	106 Virginis -	6	14 21 49.78			6 19		
	μ Virginis -	4	14 36 11.92			S. 5 6		
24	106 Virginis -	6	14 21 49.82			S. 6 19		
	μ Virginis -	4	14 36 11.95			5 6		
	Moon II. L.	- -	14 34 5.19	139.24	67.87	9 33 36.9	-719.4	
	Moon II. U.	23.2	15 2 4.58	140.71	68.22	11 52 39.1	669.2	
	ζ Libræ - -	4	15 20 54.70			16 16		
	γ Libræ - -	4½	15 28 14.28			S. 14 21		
25	ζ Libræ - -	4	15 20 54.73			S. 16 16		
	γ Libræ - -	4½	15 28 14.31			14 21		
	Moon II. L.	- -	15 30 23.15	142.42	68.64	14 0 35.7	-608.6	
	Moon II. U.	24.3	15 59 3.01	144.23	69.07	15 55 27.1	538.4	
	ψ Ophiuchi -	5	16 16 28.51			19 44		
	φ Ophiuchi -	5	16 23 40.81			S. 16 20		
26	ψ Ophiuchi -	5	16 16 28.54			S. 19 44		
	φ Ophiuchi -	5	16 23 40.84			16 20		
	Moon II. L.	- -	16 28 4.32	145.97	69.47	17 35 23.3	-459.5	
	Moon II. U.	25.3	16 57 25.20	147.46	69.80	18 58 45.5	-373.0	
	ξ Ophiuchi -	5	17 13 11.20			20 58		
	58 Ophiuchi -	5	17 35 36.67			S. 21 37		
27	ξ Ophiuchi -	5	17 13 11.23			S. 20 58		



# MOON-CULMINATING STARS, 1870. 393

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.				
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.
Jan. 27	58 Ophiuchi-	5	<sup>h</sup> 17 <sup>m</sup> 35 <sup>s</sup> 36.69			<sup>°</sup> S. 21 <sup>'</sup> 37	
	Moon II. L.	-	17 27 1.62	148.52	70.03	20 4 12.1	-280.5
	Moon II. U.	26.4	17 56 47.47	149.01	70.12	S. 20 50 41.9	183.9
	28 Moon II. L.	-	18 26 35.13	148.81	70.04	S. 21 17 37.9	- 85.3
	Moon II. U.	27.4	18 56 15.90	147.86	69.78	21 24 50.8	+ 12.9
	29 Moon II. L.	-	19 25 40.87	146.18	69.34	S. 21 12 38.5	+108.5
	Moon II. U.	28.5	19 54 41.60	143.84	68.75	20 41 46.2	199.3
	30 Moon II. L.	-	20 23 10.91	140.97	68.02	S. 19 53 21.6	+283.6
	Moon II. U.	29.5	20 51 3.27	137.71	67.19	18 48 51.2	360.0
	31 Moon I. L.	-	21 16 2.46	134.39	66.32	S. 17 29 54.8	+427.8
Feb. 1	Moon I. U.	0.9	21 42 34.03	130.87	65.43	S. 15 58 18.8	+486.6
	Moon I. L.	-	22 8 23.75	127.44	64.55	14 15 51.7	536.4
	2 Moon I. U.	1.9	22 33 33.47	124.23	63.72	S. 12 24 21.2	+577.3
	Moon I. L.	-	22 58 6.38	121.32	62.98	10 25 30.0	609.9
	3 Moon I. U.	2.9	23 22 6.62	118.79	62.33	S. 8 20 54.2	+634.8
	Moon I. L.	-	23 45 39.18	116.71	61.80	6 12 3.7	652.5
	4 Moon I. U.	4.0	0 8 49.58	115.11	61.40	S. 4 0 20.8	+663.6
	Moon I. L.	-	0 31 43.74	114.01	61.14	1 47 1.2	668.7
	12 Ceti - - -	6	0 23 22.88			4 40	
	13 Ceti - - -	5½	0 28 32.02			S. 4 18	
	5 12 Ceti - - -	6	0 23 22.87			S. 4 40	
	13 Ceti - - -	5½	0 28 32.01			S. 4 18	
	Moon I. U.	5.0	0 54 27.79	113.43	61.01	N. 0 26 44.2	+668.0
	Moon I. L.	-	1 17 8.11	113.38	61.04	2 39 48.5	661.9
	f Piscium -	6	1 11 4.61			2 56	
	μ Piscium *	5	1 23 21.42			N. 5 28	
	6 f Piscium -	6	1 11 4.60			N. 2 56	
	μ Piscium *	5	1 23 21.40			5 28	
	Moon I. U.	6.0	1 39 51.12	113.87	61.20	4 51 8.0	+650.5
	Moon I. L.	-	2 2 43.24	114.90	61.51	6 59 39.4	633.8
	ξ Ceti - - *	4½	2 6 5.76			8 14	
	ξ Arietis - *	5½	2 17 50.32			N. 10 1	
	7 ξ Ceti - - *	4½	2 6 5.75			N. 8 14	
	ξ Arietis - *	5½	2 17 50.30			10 1	
	Moon I. U.	7.1	2 25 50.90	116.46	61.06	9 4 17.8	+611.7
	Moon I. L.	-	2 49 20.39	118.54	62.54	11 3 56.3	583.8
	μ Ceti - - *	4	2 37 54.34			9 34	
	σ Arietis -	6	2 44 18.40			N. 14 33	
	8 μ Ceti - - *	4	2 37 54.32			N. 9 34	
	σ Arietis -	6	2 44 18.38			14 33	
	Moon I. U.	8.1	3 13 17.79	121.11	63.24	12 57 23.3	+549.7
	Moon I. L.	-	3 37 48.68	124.12	64.05	14 43 21.4	+508.9
	f Tauri - *	4	3 23 41.55			12 29	
	e Tauri - *	5	3 41 8.32			N. 10 45	



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
			h m s	"	"	° ' "	"	
Feb. 9	f Tauri - *	4	3 23 41.54			N. 12 29		
	e Tauri - *	5	3 41 8.30			10 45		
	Moon I. U.	9.1	4 2 58.07	127.51	64.94	16 20 26.8	+460.8	
	Moon I. L.	- -	4 28 50.07	131.20	65.89	17 47 8.5	404.8	
	a Tauri - -	3½	4 21 1.45			18 53		
	α Tauri - -	1	4 28 27.65			N. 16 15		
10	a Tauri - -	3½	4 21 1.44			N. 18 53		
	α Tauri - -	1	4 28 27.64			16 15		
	Moon I. U.	10.1	4 55 27.59	135.07	66.86	19 1 49.3	+340.5	
	Moon I. L.	- -	5 22 51.93	138.98	67.82	20 2 47.2	267.6	
	119 Tauri - -	5½	5 24 35.76			18 30		
	ζ Tauri - -	3½	5 29 52.82			N. 21 4		
11	119 Tauri - -	5½	5 24 35.74			N. 18 30		
	ζ Tauri - -	3½	5 29 52.81			21 4		
	Moon I. U.	11.2	5 51 2.47	142.74	68.74	20 48 19.0	+186.2	
	Moon I. L.	- -	6 19 56.51	146.19	69.56	21 16 45.1	96.8	
	μ Geminor.	3	6 15 6.09			22 35		
	ν Geminor.	4½	6 21 15.03			N. 20 17		
12	μ Geminor.	3	6 15 6.07			N. 22 35		
	ν Geminor.	4½	6 21 15.02			20 17		
	Moon I. U.	12.2	6 49 29.06	149.14	70.24	21 26 35.2	+ 0.5	
	Moon I. L.	- -	7 19 33.13	151.42	70.76	21 16 36.7	-101.0	
	δ Geminor.	3½	7 12 22.00			22 13		
	κ Geminor.	3½	7 36 36.41			N. 24 42		
13	δ Geminor.	3½	7 12 22.00			N. 22 13		
	κ Geminor.	3½	7 36 36.40			24 42		
	Moon I. U.	13.3	7 50 0.01	152.93	71.09	20 45 59.9	-205.4	
	Moon I. L.	- -	8 20 40.12	153.62	71.23	19.54 26.0	310.0	
	η Cancri - -	6	8 25 11.93			20 53		
	γ Cancri - -	4½	8 35 46.33			N. 21 56		
14	η Cancri - -	6	8 25 11.93			N. 20 53		
	γ Cancri - -	4½	8 35 46.33			21 56		
	Moon I. U.	14.3	8 51 23.79	153.53	71.19	18 42 11.0	-411.8	
	Moon I. L.	- -	9 22 2.12	152.75	70.98	17 10 7.3	507.6	
	π Cancri - -	6	9 8 3.90			15 29		
	83 Cancri - -	6	9 11 43.97			N. 18 15		
15	π Cancri - -	6	9 8 3.90			N. 15 29		
	83 Cancri - -	6	9 11 43.98			18 15		
	Moon I. U.	15.3	9 52 27.79	151.45	70.66	15 19 42.5	-594.8	
	α Leonis - *	1½	10 1 27.52			12 36		
16	ρ Leonis - *	4	10 25 58.62			N. 9 58		
	α Leonis - *	1½	10 1 27.53			N. 12 36		
	ρ Leonis - *	4	10 25 58.63			9 58		
	Moon II. L.	- -	10 24 56.00	149.72	70.26	13 12 55.7	-670.9	
	Moon II. U.	16.4	10 54 41.85	147.91	69.82	10 52 11.4	-734.1	
	σ Leonis - *	4	11 14 26.64			6 44		
	ν Virginis *	4½	11 39 11.44			N. 7 15		



# MOON-CULMINATING STARS, 1870. 395

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	s	s	N. ° ' "	"	
Feb. 17	♌ Leonis - *	4	11 14 26.65			N. 6 44		
	♍ Virginis *	4½	11 39 11.46			7 15		
	Moon II. L.	- -	11 24 6.02	146.13	69.40	8 20 13.0	-783.1	
	Moon II. U.	17.4	11 53 9.78	144.54	69.03	5 39 55.6	817.2	
	♍ Virginis -	3½	12 13 15.80			N. 0 3		
18	♍ Virginis -	2½	12 35 4.89			S. 0 44		
	♍ Virginis -	3½	12 13 15.82			N. 0 3		
	♍ Virginis -	2½	12 35 4.92			S. 0 44		
	Moon II. L.	- -	12 21 56.07	143.24	68.74	N. 2 54 20.9	-836.0	
	Moon II. U.	18.5	12 50 28.96	142.32	68.53	N. 0 6 30.2	839.9	
19	♌ Virginis -	4½	13 3 13.60			S. 4 51		
	♌ Virginis -	3½	13 28 4.52			N. 0 4		
	♌ Virginis -	4½	13 3 13.63			S. 4 51		
	♌ Virginis -	3½	13 28 4.54			N. 0 4		
	Moon II. L.	- -	13 18 53.30	141.81	68.44	S. 2 40 39.7	-829.4	
20	Moon II. U.	19.5	13 47 14.17	141.74	68.45	5 24 19.2	805.0	
	♍ Virginis -	4½	14 5 58.11			9 40		
	♍ Virginis -	4	14 9 12.32			S. 5 23		
	♍ Virginis -	4½	14 5 58.13			S. 9 40		
	♍ Virginis -	4	14 9 12.34			5 23		
21	Moon II. L.	- -	14 15 36.55	142.06	68.56	8 1 47.9	-767.7	
	Moon II. U.	20.5	14 44 4.91	142.72	68.75	10 30 36.5	718.5	
	♌ Libræ - -	6	15 15 46.70			14 40		
	♌ Libræ - -	4½	15 28 15.13			S. 14 21		
	♌ Libræ - -	6	15 15 46.73			S. 14 40		
22	♌ Libræ - -	4½	15 28 15.16			14 21		
	Moon II. L.	- -	15 12 42.82	143.63	68.99	12 48 28.1	-658.4	
	Moon II. U.	21.6	15 41 32.68	144.69	69.27	14 53 19.1	588.6	
	♏ Scorpii - -	2	15 57 52.39			19 27		
	♏ Scorpii - -	4	16 4 26.18			S. 19 7		
23	♏ Scorpii - -	2	15 57 52.42			S. 19 27		
	♏ Scorpii - -	4	16 4 26.21			19 7		
	Moon II. L.	- -	16 10 35.39	145.75	69.54	16 43 19.6	-510.2	
	Moon II. U.	22.6	16 39 50.21	146.68	69.76	18 16 56.2	424.8	
	♏ Ophiuchi-	2½	17 2 54.69			15 34		
24	♏ Serpentis	3½	17 30 7.69			S. 15 19		
	♏ Ophiuchi-	2½	17 2 54.72			S. 15 34		
	♏ Serpentis	3½	17 30 7.72			15 19		
	Moon II. L.	- -	17 9 14.58	147.32	69.91	19 32 52.7	-333.8	
	Moon II. U.	23.6	17 38 44.35	147.56	69.96	20 30 13.0	239.1	
25	♐ Sagittarii	4	18 5 58.08			21 5		
	♐ Sagittarii	5	18 17 35.22			S. 20 36		
	♐ Sagittarii	4	18 5 58.11			S. 21 5		
	♐ Sagittarii	5	18 17 35.25			20 36		
	Moon II. L.	- -	18 8 13.95	147.28	69.87	21 8 22.5	-142.3	
26	Moon II. U.	24.7	18 37 36.78	146.42	69.62	21 27 9.1	45.6	
	♐ Sagittarii	4	18 49 56.96			S. 21 16		



# 396 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Feb. 24	♈ Sagittarii	3	h m s	s	s	° ' "	"	
			19 2 0.42			S. 21 14		
25	♈ Sagittarii	4	18 49 56.98			S. 21 16		
	♈ Sagittarii	3	19 2 0.45			21 14		
	Moon II. L.	- -	19 6 45.83	144.99	69.24	21 26 44.0	+ 49.3	
	Moon II. U.	25.7	19 35 34.24	142.99	68.71	S. 21 7 39.9	140.6	
26	Moon II. L.	- -	20 3 55.79	140.53	68.06	S. 20 30 50.5	+ 226.7	
	Moon II. U.	26.8	20 31 45.45	137.70	67.31	19 37 25.5	306.3	
27	Moon II. L.	- -	20 58 59.62	134.64	66.50	S. 18 28 47.9	+ 378.6	
	Moon II. U.	27.8	21 25 36.29	131.47	65.67	17 6 30.2	443.0	
28	Moon II. L.	- -	21 51 34.93	128.32	64.82	S. 15 32 9.7	+ 499.1	
	Moon II. U.	28.8	22 16 56.45	125.30	64.02	13 47 25.8	546.9	
Mar. 1	Moon II. L.	- -	22 41 43.03	122.51	63.27	S. 11 53 57.9	+ 586.5	
2	Moon I. U.	0.1	23 3 52.58	120.11	62.60	S. 9 53 22.1	+ 618.2	
	Moon I. L.	- -	23 27 40.56	117.95	62.02	7 47 11.0	642.4	
3	Moon I. U.	1.2	23 51 4.91	116.18	61.56	S. 5 36 52.7	+ 659.5	
	Moon I. L.	- -	0 14 10.53	114.83	61.21	3 23 50.2	669.8	
4	Moon I. U.	2.2	0 37 2.67	113.93	60.99	S. 1 9 22.9	+ 673.7	
	Moon I. L.	- -	0 59 46.72	113.49	60.90	N. 1 5 14.9	671.6	
5	Moon I. U.	3.2	1 22 28.25	113.51	60.94	N. 3 18 51.2	+ 663.5	
	Moon I. L.	- -	1 45 12.83	114.00	61.12	5 30 16.7	649.8	
	♈ Piscium *	4½	1 34 38.67			4 50		
	♈ Piscium *	4	1 38 30.61			N. 8 30		
6	♈ Piscium *	4½	1 34 38.66			N. 4 50		
	♈ Piscium *	4	1 38 30.60			8 30		
	Moon I. U.	4.3	2 8 6.14	114.96	61.42	7 38 23.5	+ 630.4	
	Moon I. L.	- -	2 31 13.66	116.37	61.84	9 42 3.3	605.3	
	♈ Ceti - - *	4	2 21 13.77			7 53		
	♈ Ceti - - *	4	2 37 53.94			N. 9 34		
7	♈ Ceti - - *	4	2 21 13.75			N. 7 53		
	♈ Ceti - - *	4	2 37 53.93			9 34		
	Moon I. U.	5.3	2 54 40.83	118.23	62.39	11 40 6.7	+ 574.3	
	Moon I. L.	- -	3 18 32.84	120.51	63.04	13 31 22.9	537.3	
	♈ Tauri - - *	3½	3 20 6.63			9 17		
	♈ Tauri - - *	4	3 23 41.11			N. 12 29		
8	♈ Tauri - - *	3½	3 20 6.61			N. 9 17		
	♈ Tauri - - *	4	3 23 41.10			12 29		
	Moon I. U.	6.3	3 42 54.48	123.16	63.78	15 14 36.8	+ 493.9	
	Moon I. L.	- -	4 7 49.98	126.14	64.60	16 48 30.0	443.8	
	♈ Tauri - - *	4	4 15 25.68			17 14		
	♈ Tauri - - *	3½	4 21 0.98			N. 18 53		
9	♈ Tauri - - *	4	4 15 25.67			N. 17 14		
	♈ Tauri - - *	3½	4 21 0.96			18 53		
	Moon I. U.	7.4	4 33 22.86	129.38	65.47	18 11 40.0	+ 386.7	
	Moon I. L.	- -	4 59 35.65	132.77	66.36	N. 19 22 40.5	+ 322.2	



# MOON-CULMINATING STARS, 1870. 397

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. per. mer.	Declination.		
			h m s	s	s	° ' "	"	
Mar. 9	♈ Tauri - -	5	4 55 19.16			N.21 24		
	♈ Tauri - -	5½	5 0 6.48			20 15		
10	♈ Tauri - -	5	4 55 19.14			N.21 24		
	♈ Tauri - -	5½	5 0 6.46			20 15		
	Moon I. U.	8.4	5 26 29.62	136.22	67.24	20 20	2.6 +250.3	
	Moon I. L.	- -	5 54 4.58	139.58	68.09	21 2	17.2 170.9	
	♈ Orionis -	4½	5 46 40.84			20 15		
11	♈ Geminor.	3½	6 7 1.71			N.22 33		
	♈ Orionis -	4½	5 46 40.82			N.20 15		
	♈ Geminor.	3½	6 7 1.70			22 33		
	Moon I. U.	9.4	6 22 18.71	142.72	68.87	21 27	57.7 + 84.7	
	Moon I. L.	- -	6 51 8.53	145.51	69.53	21 35	44.9 - 7.8	
12	♈ Geminor.	4	6 56 24.03			20 45		
	♈ Geminor.	3½	7 12 21.68			N.22 13		
	♈ Geminor.	4	6 56 24.01			N.20 45		
	♈ Geminor.	3½	7 12 21.67			22 13		
	Moon I. U.	10.5	7 20 28.94	147.81	70.08	21 24	31.5 -105.2	
13	Moon I. L.	- -	7 50 13.64	149.54	70.47	20 53	28.4 205.8	
	♈ Geminor.	3½	7 36 36.10			24 42		
	♈ Cancrī - -	5½	8 0 7.17			N.21 57		
	♈ Geminor.	3½	7 36 36.08			N.24 42		
	♈ Cancrī - -	5½	8 0 7.16			21 57		
14	Moon I. U.	11.5	8 20 15.47	150.66	70.71	20 2	8.7 -307.5	
	Moon I. L.	- -	8 50 27.06	151.18	70.80	18 50	33.9 407.9	
	♈ Cancrī - -	4	8 37 18.28			18 38		
	♈ Cancrī - -	5	9 1 53.55			N.22 34		
	♈ Cancrī - -	4	8 37 18.27			N.18 38		
15	♈ Cancrī - -	5	9 1 53.54			22 34		
	Moon I. U.	12.5	9 20 41.54	151.15	70.76	17 19	14.9 -504.4	
	Moon I. L.	- -	9 50 53.02	150.70	70.61	15 29	15.8 594.2	
	♈ Leonis - *	5	9 51 14.43			13 4		
	♈ Leonis - *	1½	10 1 27.56			N.12 36		
16	♈ Leonis - *	5	9 51 14.42			N.13 4		
	♈ Leonis - *	1½	10 1 27.55			12 36		
	Moon I. U.	13.6	10 20 57.08	149.94	70.41	13 22	11.5 -674.8	
	Moon I. L.	- -	10 50 51.04	149.04	70.17	11 0	6.6 743.9	
	♈ Leonis - *	5	10 42 26.16			11 14		
17	♈ Leonis - *	5	10 58 19.48			N. 8 2		
	♈ Leonis - *	5	10 42 26.16			N.11 14		
	♈ Leonis - *	5	10 58 19.48			8 2		
	Moon I. U.	14.6	11 20 33.99	148.13	69.93	8 25	31.6 -799.5	
	♈ Virginis *	4½	11 39 11.74			7 15		
18	♈ Virginis -	3½	11 43 56.42			N. 2 30		
	♈ Virginis *	4½	11 39 11.74			N. 7 15		
	♈ Virginis -	3½	11 43 56.42			2 30		
19	Moon II. L.	- -	11 52 26.12	147.32	69.74	N. 5 41	18.2 -840.1	



# 398 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.				
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.
Mar. 17	Moon II. U.	15.7	<sup>h</sup> 12 <sup>m</sup> 21 <sup>s</sup> 50.33	146.77	69.60	N. 2 50 33.9	-864.5
	37 Virginis -	6	12 45 0.83			N. 3 46	
	48 Virginis -	6	12 57 13.47			S. 2 58	
18	37 Virginis -	6	12 45 0.84			N. 3 46	
	48 Virginis -	6	12 57 13.48			S. 2 58	
	Moon II. L.	- -	12 51 9.64	146.51	69.55	0 3 23.9	-872.3
	Moon II. U.	16.7	13 20 27.76	146.57	69.58	2 57 14.0	863.3
	m Virginis -	6	13 34 48.32			8 3	
	95 Virginis -	6	13 59 51.28			S. 8 42	
19	m Virginis -	6	13 34 48.33			S. 8 3	
	95 Virginis -	6	13 59 51.30			8 42	
	Moon II. L.	- -	13 49 48.53	146.95	69.70	5 47 36.5	-837.8
	Moon II. U.	17.7	14 19 15.50	147.59	69.89	8 31 18.9	796.7
	α' Libræ - -	2½	14 43 42.02			15 30	
	γ' Libræ - -	5	14 59 23.37			S. 15 45	
20	α' Libræ - -	2½	14 43 42.05			S. 15 30	
	γ' Libræ - -	5	14 59 23.40			15 45	
	Moon II. L.	- -	14 48 51.46	148.43	70.13	11 5 20.7	-741.3
	Moon II. U.	18.8	15 18 38.09	149.35	70.38	13 26 57.5	672.9
	θ Libræ - -	4½	15 46 26.13			16 21	
	49 Libræ - -	5½	15 53 2.27			S. 16 9	
21	θ Libræ - -	4½	15 46 26.16			S. 16 21	
	49 Libræ - -	5½	15 53 2.29			16 9	
	Moon II. L.	- -	15 48 35.62	150.22	70.63	15 33 45.4	-593.4
	Moon II. U.	19.8	16 18 42.65	150.90	70.83	17 23 43.0	504.9
	29 Ophiuchi-	6	16 54 15.14			18 41	
	γ Ophiuchi-	2½	17 2 55.51			S. 15 34	
22	29 Ophiuchi-	6	16 54 15.17			S. 18 41	
	γ Ophiuchi-	2½	17 2 55.54			15 34	
	Moon II. L.	- -	16 48 56.00	151.25	70.94	18 55 15.0	-409.5
	Moon II. U.	20.9	17 19 10.95	151.15	70.93	20 7 12.8	309.6
	58 Ophiuchi-	5	17 35 38.36			21 37	
	μ' Sagittarii	4	18 5 58.92			S. 21 5	
23	58 Ophiuchi-	5	17 35 38.39			S. 21 37	
	μ' Sagittarii	4	18 5 58.95			21 5	
	Moon II. L.	- -	17 49 21.43	150.50	70.79	20 58 56.8	-207.6
	Moon II. U.	21.9	18 19 20.54	149.25	70.49	21 30 15.4	105.7
	♂ Sagittarii	4	18 49 57.76			21 16	
	π Sagittarii	3	19 2 1.22			S. 21 14	
24	♂ Sagittarii	4	18 49 57.79			S. 21 16	
	π Sagittarii	3	19 2 1.25			21 14	
	Moon II. L.	- -	18 49 1.09	147.41	70.03	21 41 22.8	- 6.1
	Moon II. U.	22.9	19 18 16.33	145.04	69.43	21 32 57.4	+ 89.5
	f Sagittarii	5	19 38 45.84			20 4	
	57 Sagittarii	5½	19 44 37.79			S. 19 22	
25	f Sagittarii	5	19 38 45.87			S. 20 4	



# MOON-CULMINATING STARS, 1870. 399

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	"	"	° ' "	"	
Mar. 25	57 Sagittarii	5½	19 44 37.82			S. 19 22		
	Moon II.L.	- -	19 47 0.27	142.22	68.71	21 5 57.4	+179.5	
	Moon II.U.	24.0	20 15 8.35	139.08	67.90	20 21 36.9	262.7	
	20 Capricorni	6	20 52 11.69			19 32		
	θ Capricorni	4	20 58 37.10			S. 17 45		
	26	20 Capricorni	6	20 52 11.72			S. 19 32	
		θ Capricorni	4	20 58 37.13			17 45	
		Moon II.L.	- -	20 42 37.43	135.75	67.02	19 21 21.1	+338.6
		Moon II.U.	25.0	21 9 26.08	132.36	66.12	18 6 42.2	406.6
		γ Capricorni	3½	21 32 51.92			17 15	
		δ Capricorni	3	21 39 50.45			S. 16 43	
	27	γ Capricorni	3½	21 32 51.95			S. 17 15	
		δ Capricorni	3	21 39 50.47			16 43	
		Moon II.L.	- -	21 35 34.29	129.03	65.22	16 39 15.8	+466.5
Moon II.U.		26.0	22 1 3.48	125.87	64.36	S. 15 0 37.9	518.5	
28	Moon II.L.	- -	22 25 56.17	122.96	63.55	S. 13 12 23.7	+562.6	
	Moon II.U.	27.1	22 50 15.75	120.36	62.82	11 16 5.1	599.2	
29	Moon II.L.	- -	23 14 6.33	118.13	62.19	S. 9 13 11.0	+628.6	
	Moon II.U.	28.1	23 37 32.48	116.30	61.67	7 5 6.9	651.0	
30	Moon II.L.	- -	0 0 39.11	114.88	61.26	S. 4 53 14.6	+666.7	
	Moon II.U.	29.1	0 23 31.28	113.89	60.98	2 38 53.1	675.9	
31	Moon I.L.	- -	0 44 12.60	113.36	60.82	S. 0 23 19.1	+678.8	
Apr. 1	Moon I.U.	0.4	1 6 51.65	113.22	60.80	N. 1 52 12.9	+675.6	
	Moon I.L.	- -	1 29 31.71	113.52	60.89	4 6 29.9	666.3	
	2	Moon I.U.	1.5	1 52 17.92	114.25	61.11	N. 6 18 18.8	+650.9
		Moon I.L.	- -	2 15 15.33	115.39	61.45	8 26 27.1	629.5
	3	Moon I.U.	2.5	2 38 28.75	116.91	61.90	N. 10 29 41.5	+601.9
		Moon I.L.	- -	3 2 2.71	118.81	62.45	12 26 47.6	568.1
	4	Moon I.U.	3.5	3 26 1.40	121.03	63.08	N. 14 16 29.6	+527.8
		Moon I.L.	- -	3 50 28.46	123.53	63.79	15 57 29.7	481.1
		λ Tauri - *	3½	3 53 27.64			12 7	
	B.A.C. 1272	6	4 0 31.78			N. 17 0		
	5	λ Tauri - *	3½	3 53 27.63			N. 12 7	
		B.A.C. 1272	6	4 0 31.77			17 0	
		Moon I.U.	4.6	4 15 26.92	126.25	64.55	17 28 28.9	+427.7
		Moon I.L.	- -	4 40 58.93	129.11	65.33	18 48 6.8	367.5
α Tauri - -		1	4 28 26.74			16 15		
6	τ Tauri - -	4½	4 34 25.64			N. 22 42		
	α Tauri - -	1	4 28 26.73			N. 16 15		
	τ Tauri - -	4½	4 34 25.62			22 42		
	Moon I.U.	5.6	5 7 5.72	132.03	66.13	19 55 2.3	+300.6	
	Moon I.L.	- -	5 33 47.37	134.90	66.90	20 47 56.1	+227.3	
	ζ Tauri - -	3½	5 29 51.86			21 4		
	χ <sup>1</sup> Orionis - -	4½	5 46 40.34			N. 20 15		



# 400 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
			h m s	"	"	° ' "	"	
Apr. 7	ζ Tauri - -	3½	5 29 51.84			N. 21 4		
	χ Orionis -	4½	5 46 40.33			20 15		
	Moon I. U.	6.6	6 1 2.72	137.62	67.61	21 25 31.9	+ 147.7	
	Moon I. L.	- -	6 28 49.34	140.10	68.26	21 46 38.8	+ 62.6	
	μ Geminor.	3	6 15 5.14			22 35		
	ν Geminor.	4½	6 21 14.11			N. 20 17		
8	μ Geminor.	3	6 15 5.12			N. 22 35		
	ν Geminor.	4½	6 21 14.09			20 17		
	Moon I. U.	7.7	6 57 3.65	142.22	68.80	21 50 14.7	- 27.3	
	Moon I. L.	- -	7 25 41.07	143.94	69.23	21 35 29.7	120.7	
	δ Geminor.	3½	7 12 21.17			22 13		
	63 Geminor.	5½	7 20 1.12			N. 21 43		
9	δ Geminor.	3½	7 12 21.16			N. 22 13		
	63 Geminor.	5½	7 20 1.10			21 43		
	Moon I. U.	8.7	7 54 36.39	145.20	69.54	21 1 49.1	- 216.3	
	Moon I. L.	- -	8 23 44.17	146.02	69.72	20 8 56.5	312.4	
	η Cancri - -	6	8 25 11.33			20 53		
	γ Cancri - -	4½	8 35 45.76			N. 21 56		
10	η Cancri - -	6	8 25 11.32			N. 20 53		
	γ Cancri - -	4½	8 35 45.74			21 56		
	Moon I. U.	9.7	8 52 59.20	146.42	69.81	18 56 56.1	- 407.3	
	Moon I. L.	- -	9 22 16.96	146.49	69.80	17 26 15.5	498.8	
	83 Cancri - -	6	9 11 43.56			18 15		
	ψ Leonis - -	6	9 36 39.41			N. 14 37		
11	83 Cancri - -	6	9 11 43.55			N. 18 15		
	ψ Leonis - -	6	9 36 39.39			14 37		
	Moon I. U.	10.8	9 51 33.99	146.32	69.73	15 37 45.3	- 585.2	
	Moon I. L.	- -	10 20 48.14	146.03	69.62	13 32 40.4	664.3	
	ρ Leonis - *	4	10 25 58.55			9 58		
	λ Leonis - *	5	10 42 26.02			N. 11 14		
12	ρ Leonis - *	4	10 25 58.54			N. 9 58		
	λ Leonis - *	5	10 42 26.01			11 14		
	Moon I. U.	11.8	10 49 58.72	145.74	69.52	11 12 40.3	- 734.0	
	Moon I. L.	- -	11 19 6.43	145.57	69.46	8 39 48.4	792.6	
	χ Leonis - *	5	10 58 19.37			8 2		
	σ Leonis - *	4	11 14 26.80			N. 6 44		
13	χ Leonis - *	5	10 58 19.36			N. 8 2		
	σ Leonis - *	4	11 14 26.79			6 44		
	Moon I. U.	12.8	11 48 13.32	145.62	69.44	5 56 30.2	- 838.1	
	Moon I. L.	- -	12 17 22.40	145.95	69.51	3 5 31.5	869.1	
	η Virginis -	3½	12 13 16.26			N. 0 3		
	γ Virginis -	2½	12 35 5.46			S. 0 44		
14	η Virginis -	3½	12 13 16.25			N. 0 3		
	γ Virginis -	2½	12 35 5.46			S. 0 44		
	Moon I. U.	13.9	12 46 37.46	146.62	69.66	N. 0 9 56.5	- 884.0	
	Moon I. L.	- -	13 16 2.65	147.64	69.90	S. 2 46 56.5	- 881.9	
	θ Virginis -	4½	13 3 14.30			S. 4 51		



# MOON-CULMINATING STARS, 1870. 401

At Greenwich Transit.									
Month and Day.	Name.	Mag- nitude.				Var. of ☾'s R.A. in 1 hour of Long.	Sidereal Time of ☾'s Sem. pas. mer.	Declination.	Var. of ☾'s Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.						
Apr. 14	65 Virginis -	6	<sup>h</sup> 13 <sup>m</sup> 16 <sup>s</sup> 35.96	"	"	S. 4 15	"		
15	θ Virginis -	4½	13 3 14.30			S. 4 51			
	65 Virginis -	6	13 16 35.97			4 15			
	Moon II. U.	14.9	13 48 2.44	149.03	70.23	5 41 40.0	-862.3		
	κ Virginis -	4½	14 5 59.11			9 40			
	2 Libræ - -	6	14 16 27.18			S. 11 7			
16	κ Virginis -	4½	14 5 59.12			S. 9 40			
	2 Libræ - -	6	14 16 27.19			11 7			
	Moon II. L.	- -	14 18 0.09	150.62	70.62	8 30 42.9	-825.2		
	Moon II. U.	16.0	14 48 17.72	152.33	71.06	11 10 37.6	771.1		
	5 Libræ - -	4	15 20 56.90			16 16			
	7 Libræ - -	4½	15 28 16.49			S. 14 21			
17	5 Libræ - -	4	15 20 56.92			S. 16 16			
	7 Libræ - -	4½	15 28 16.50			14 21			
	Moon II. L.	- -	15 18 55.97	154.03	71.49	13 38 6.5	-701.2		
	Moon II. U.	17.0	15 49 53.57	155.52	71.88	15 50 10.9	617.4		
	ν Scorpis - -	4	16 4 27.68			19 7			
	ψ Ophiuchi -	5	16 16 30.91			S. 19 44			
18	ν Scorpis - -	4	16 4 27.70			S. 19 7			
	ψ Ophiuchi -	5	16 16 30.93			19 44			
	Moon II. L.	- -	16 21 6.93	156.62	72.17	17 44 17.5	-522.0		
	Moon II. U.	18.0	16 52 30.25	157.15	72.34	19 18 25.3	418.1		
	ξ Ophiuchi -	5	17 13 13.69			20 58			
	58 Ophiuchi -	5	17 35 39.17			S. 21 37			
19	ξ Ophiuchi -	5	17 13 13.72			S. 20 58			
	58 Ophiuchi -	5	17 35 39.20			21 37			
	Moon II. L.	- -	17 23 55.67	156.95	72.32	20 31 9.8	-308.7		
	Moon II. U.	19.1	17 55 13.97	155.95	72.12	21 21 46.6	197.3		
	μ Sagittarii	4	18 5 59.78			21 5			
	21 Sagittarii	5	18 17 36.92			S. 20 36			
20	μ Sagittarii	4	18 5 59.81			S. 21 5			
	21 Sagittarii	5	18 17 36.95			20 36			
	Moon II. L.	- -	18 26 15.25	154.12	71.71	21 50 9.5	- 87.0		
	Moon II. U.	20.1	18 56 49.91	151.53	71.11	21 56 48.5	+ 19.6		
	ρ Sagittarii	4	19 14 8.00			18 5			
	f Sagittarii	5	19 38 46.68			S. 20 4			
21	ρ Sagittarii	4	19 14 8.03			S. 18 5			
	f Sagittarii	5	19 38 46.71			20 4			
	Moon II. L.	- -	19 26 49.41	148.29	70.33	21 42 43.8	+120.0		
	Moon II. U.	21.2	19 56 7.08	144.58	69.42	21 9 18.7	212.7		
	ρ Capricorni	5	20 21 26.19			18 14			
	υ Capricorni	5½	20 32 38.52			S. 18 36			
22	ρ Capricorni	5	20 21 26.22			S. 18 14			
	υ Capricorni	5½	20 32 38.55			18 36			
	Moon II. L.	- -	20 24 38.26	140.58	68.42	20 18 12.4	+296.8		
	Moon II. U.	22.2	20 52 20.64	136.48	67.38	S. 19 11 12.6	+371.6		



# 402 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	"	"	° ' "	"	"
Apr. 22	Capricorni	4½	21 14 59.86			S. 17 23		
	Capricorni	4½	21 29 47.35			20 3		
23	Capricorni	4½	21 14 59.89			S. 17 23		
	Capricorni	4½	21 29 47.38			20 3		
	Moon II. L.	-	21 19 13.93	132.43	66.32	17 50 9.5	+437.3	
	Moon II. U.	23.2	21 45 19.72	128.58	65.30	16 16 52.4	494.1	
	Aquarii	4	21 59 24.11			14 30		
	Aquarii	4½	22 23 45.08			S. 11 20		
24	Aquarii	4	21 59 24.14			S. 14 30		
	Aquarii	4½	22 23 45.11			11 20		
	Moon II. L.	-	22 10 41.05	125.03	64.34	14 33 5.3	+542.4	
	Moon II. U.	24.3	22 35 22.06	121.87	63.46	12 40 26.9	582.7	
	Aquarii	4	22 42 41.55			14 17		
	Aquarii	5½	22 58 22.14			S. 8 24		
25	Aquarii	4	22 42 41.58			S. 14 17		
	Aquarii	5½	22 58 22.16			8 24		
	Moon II. L.	-	22 59 27.66	119.14	62.70	10 40 29.0	+615.7	
	Moon II. U.	25.3	23 23 3.32	116.88	62.05	8 34 37.6	641.7	
	Piscium	5	23 55 16.50			6 44		
	Piscium	5	23 58 39.79			S. 6 26		
26	Piscium	5	23 55 16.52			S. 6 44		
	Piscium	5	23 58 39.81			6 26		
	Moon II. L.	-	23 46 14.76	115.11	61.52	6 24 13.2	+661.3	
	Moon II. U.	26.3	0 9 7.86	113.82	61.14	S. 4 10 32.1	674.6	
	Moon II. L.	-	0 31 48.49	113.03	60.89	S. 1 54 47.6	+681.9	
	Moon II. U.	27.4	0 54 22.56	112.72	60.77	N. 0 21 48.8	683.2	
28	Moon II. L.	-	1 16 55.76	112.89	60.79	N. 2 38 6.2	+678.7	
	Moon II. U.	28.4	1 39 33.66	113.50	60.94	4 52 53.7	668.2	
29	Moon II. L.	-	2 2 21.60	114.56	61.22	N. 7 4 59.0	+651.6	
	Moon II. U.	29.4	2 25 24.62	116.01	61.61	9 13 7.7	628.8	
30	Moon I. L.	-	2 46 43.18	117.75	62.11	N. 11 16 3.6	+599.4	
May 1	Moon I. U.	0.7	3 10 28.72	119.89	62.70	N. 13 12 27.3	+563.4	
	Moon I. L.	-	3 34 41.64	122.30	63.36	15 0 57.5	520.5	
2	Moon I. U.	1.8	3 59 24.79	124.92	64.09	N. 16 40 10.7	+470.6	
	Moon I. L.	-	4 24 40.19	127.66	64.83	18 8 42.7	413.6	
3	Moon I. U.	2.8	4 50 28.65	130.42	65.58	N. 19 25 9.4	+349.7	
	Moon I. L.	-	5 16 49.93	133.11	66.31	20 28 9.2	279.2	
4	Moon I. U.	3.8	5 43 42.45	135.61	66.98	N. 21 16 25.4	+202.5	
	Moon I. L.	-	6 11 3.34	137.82	67.58	21 48 47.7	120.4	
η	Geminor.	3½	6 7 0.82			22 33		
	μ Geminor.	3	6 15 4.77			N. 22 35		
5	η Geminor.	3½	6 7 0.81			N. 22 33		
	μ Geminor.	3	6 15 4.76			22 35		
	Moon I. U.	4.9	6 38 48.64	139.66	68.08	N. 22 4 17.1	+ 33.8	



# MOON-CULMINATING STARS, 1870. 403

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
May 5	Moon I. L.	- -	<sup>h</sup> <sup>m</sup> <sup>s</sup> 7 6 53.50	141° 07	68° 46	N. 22 2' 6.6	- 56° 0	
	♊ Geminor.	4	6 56 23.11			20 45		
	♊ Geminor.	3½	7 12 20.75			N. 22 13		
	♊ Geminor.	4	6 56 23.10			N. 20 45		
6	♊ Geminor.	3½	7 12 20.74			22 13		
	Moon I. U.	5.9	7 35 12.44	142° 01	68° 73	21 41 44.5	-147° 9	
	Moon I. L.	- -	8 3 40.01	142° 51	68° 87	21 2 56.0	240° 2	
	♋ Canceri - -	5½	8 4 44.88			18 2		
	♋ Canceri - -	6	8 25 10.90			N. 20 53		
	♋ Canceri - -	5½	8 4 44.87			N. 18 2		
7	♋ Canceri - -	6	8 25 10.89			20 53		
	Moon I. U.	7.0	8 32 10.98	142° 60	68° 91	20 5 44.4	-331° 5	
	Moon I. L.	- -	9 0 41.04	142° 37	68° 86	18 50 30.9	420° 2	
	B.A.C. 3138	6	9 6 11.53			21 49		
	♋ Canceri - -	6	9 11 43.15			N. 18 15		
	♋ Canceri - -	6	9 6 11.51			N. 21 49		
8	♋ Canceri - -	6	9 11 43.13			18 15		
	Moon I. U.	8.0	9 29 6.95	141° 93	68° 75	17 17 54.8	-505° 0	
	Moon I. L.	- -	9 57 26.89	141° 39	68° 61	15 28 52.5	584° 3	
	♌ Leonis - *	1½	10 1 26.98			12 36		
	♌ Leonis - -	6	10 9 42.24			N. 14 22		
	♌ Leonis - *	1½	10 1 26.97			N. 12 36		
9	♌ Leonis - -	6	10 9 42.22			14 22		
	Moon I. U.	9.0	10 25 40.57	140° 90	68° 47	13 24 37.7	-656° 9	
	Moon I. L.	- -	10 53 49.22	140° 58	68° 38	11 6 40.0	721° 3	
	♌ Leonis - *	5	10 42 25.72			11 14		
	♌ Leonis - *	5	10 58 19.11			N. 8 2		
	♌ Leonis - *	5	10 42 25.71			N. 11 14		
10	♌ Leonis - *	5	10 58 19.10			8 2		
	Moon I. U.	10.1	11 21 55.44	140° 51	68° 34	8 36 45.3	-776° 2	
	Moon I. L.	- -	11 50 2.98	140° 81	68° 39	5 56 55.9	820° 1	
	♍ Virginis *	4½	11 39 11.54			7 15		
	♍ Virginis *	4½	11 54 13.53			N. 7 20		
	♍ Virginis *	4½	11 39 11.53			N. 7 15		
11	♍ Virginis *	4½	11 54 13.52			7 20		
	Moon I. U.	11.1	12 18 16.62	141° 54	68° 54	3 9 31.1	-851° 8	
	Moon I. L.	- -	12 46 41.73	142° 73	68° 82	N. 0 17 6.4	869° 9	
	♍ Virginis -	2½	12 35 5.39			S. 0 44		
	♍ Virginis -	6	12 46 32.99			S. 2 51		
	♍ Virginis -	2½	12 35 5.38			S. 0 44		
12	♍ Virginis -	6	12 46 32.99			2 51		
	Moon I. U.	12.1	13 15 23.94	144° 39	69° 20	2 37 26.2	-872° 9	
	Moon I. L.	- -	13 44 28.69	146° 48	69° 71	5 30 59.8	-859° 9	
	♍ Virginis -	5	13 25 13.82			5 35		
	♍ Virginis -	6	13 28 46.81			S. 4 44		
	♍ Virginis -	5	13 25 13.82			S. 5 35		



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
May 13	80 Virginis -	6	<sup>h</sup> 13 <sup>m</sup> 28 <sup>s</sup> 46·81			S. 4 44		
	Moon I. v.	13·2	14 14 0·84	148·93	70·29	8 20 15·4	-829·8	
	Moon I. L.	-	14 44 3·97	151·62	70·94	11 1 47·3	782·5	
	ξ Libræ - -	6	14 47 20·94			11 22		
	δ Libræ - -	5	14 54 3·19			S. 8 0		
14	ξ Libræ - -	6	14 47 20·94			S. 11 22		
	δ Libræ - -	5	14 54 3·20			8 0		
	Moon I. v.	14·2	15 14 39·82	154·35	71·59	13 32 8·2	-718·1	
	48 Libræ - -	4½	15 50 56·23			13 54		
	β Scorpī - -	2	15 57 54·33			S. 19 27		
15	48 Libræ - -	4½	15 50 56·24			S. 13 54		
	β Scorpī - -	2	15 57 54·34			19 27		
	Moon II. L.	-	15 48 12·23	157·03	72·21	15 47 59·0	-637·7	
	Moon II. v.	15·3	16 19 49·88	159·16	72·73	17 46 18·0	543·2	
	29 Ophiuchi-	6	16 54 16·50			18 41		
16	ξ Ophiuchi-	5	17 13 14·34			S. 20 58		
	29 Ophiuchi-	6	16 54 16·51			S. 18 41		
	ξ Ophiuchi-	5	17 13 14·36			20 58		
	Moon II. L.	-	16 51 49·28	160·61	73·10	19 24 31·4	-437·3	
	Moon II. v.	16·3	17 24 0·90	161·16	73·26	20 40 42·4	323·5	
17	58 Ophiuchi-	5	17 35 39·88			21 37		
	μ Sagittarii	4	18 6 0·52			S. 21 5		
	58 Ophiuchi-	5	17 35 39·90			S. 21 37		
	μ Sagittarii	4	18 6 0·54			21 5		
	Moon II. L.	-	17 56 12·94	160·66	73·17	21 33 39·2	-205·7	
18	Moon II. v.	17·3	18 28 12·40	159·06	72·83	22 2 57·9	-87·8	
	ξ Sagittarii	4	18 49 59·44			21 16		
	κ Sagittarii	3	19 2 2·91			S. 21 14		
	ξ Sagittarii	4	18 49 59·47			S. 21 16		
	κ Sagittarii	3	19 2 2·94			21 14		
19	Moon II. L.	-	18 59 46·35	156·43	72·23	22 9 0·6	+26·4	
	Moon II. v.	18·4	19 30 43·19	152·91	71·42	21 52 51·0	133·8	
	σ Capricorni	5½	20 11 54·21			19 31		
	ρ Capricorni	5	20 21 27·05			S. 18 14		
	σ Capricorni	5½	20 11 54·24			S. 19 31		
20	ρ Capricorni	5	20 21 27·08			18 14		
	Moon II. L.	-	20 0 53·61	148·74	70·43	21 16 4·4	+232·2	
	Moon II. v.	19·4	20 30 11·23	144·15	69·33	20 20 37·9	320·4	
	θ Capricorni	4	20 58 38·74			17 45		
	ι Capricorni	4½	21 15 0·71			S. 17 23		
20	θ Capricorni	4	20 58 38·77			S. 17 45		
	ι Capricorni	4½	21 15 0·74			17 23		
	Moon II. L.	-	20 58 32·63	139·41	68·15	19 8 39·3	+397·5	
	Moon II. v.	20·5	21 25 57·28	134·73	66·97	17 42 20·4	+463·9	
	δ Capricorni	3	21 39 52·01			16 43		
	ι Aquarii -	4	21 59 24·92			S. 14 30		



# MOON-CULMINATING STARS, 1870. 405

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Declination.	Var. of ( $\epsilon$ 's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of ( $\epsilon$ 's R.A. in 1 hour of Long.	Sidereal Time of ( $\epsilon$ 's Sem. pas. mer.				
			h m s	"	"		° ' "	"	"
May 21	$\delta$ Capricorni	3	21 39 52.04				S. 16 43		
	$\epsilon$ Aquarii -	4	21 59 24.95				14 30		
	Moon II.L.	- -	21 52 27.02	130.28	65.83		16 3 47.9	+519.9	
	Moon II.U.	21.5	22 18 5.52	126.21	64.76		14 15 1.1	566.4	
	$\tau$ Aquarii -	4	22 42 42.33				14 17		
	74 Aquarii -	6	22 46 37.86				S. 12 18		
	$\tau$ Aquarii -	4	22 42 42.36				S. 14 17		
	74 Aquarii -	6	22 46 37.89				12 18		
	Moon II.L.	- -	22 42 57.85	122.60	63.79		12 17 50.0	+604.1	
	Moon II.U.	22.5	23 7 9.95	119.51	62.94		10 13 53.7	634.0	
22	B.A.C. 8239	6	23 34 24.85				12 24		
	B.A.C. 8285	6	23 43 31.60				S. 10 42		
	B.A.C. 8239	6	23 34 24.88				S. 12 24		
	B.A.C. 8285	6	23 43 31.63				10 42		
	Moon II.L.	- -	23 30 48.30	116.98	62.23		8 4 42.0	+656.8	
	Moon II.U.	23.6	23 53 59.70	115.02	61.67		5 51 36.0	673.1	
	12 Ceti - - -	6	0 23 23.72				4 40		
	13 Ceti - - -	5.1	0 28 32.82				S. 4 18		
	12 Ceti - - -	6	0 23 23.74				S. 4 40		
	13 Ceti - - -	5.1	0 28 32.84				4 18		
24	Moon II.L.	- -	0 16 50.99	113.63	61.25		3 35 50.9	+683.4	
	Moon II.U.	24.6	0 39 29.00	112.80	60.99		S. 1 18 36.3	688.1	
	33 Ceti - - -	6	1 3 51.59				N. 1 45		
	38 Ceti - - -	6	1 8 10.18				S. 1 40		
	33 Ceti - - -	6	1 3 51.61				N. 1 45		
	38 Ceti - - -	6	1 8 10.21				S. 1 40		
	Moon II.L.	- -	1 2 0.45	112.53	60.89		N. 0 59 0.2	+687.1	
	Moon II.U.	25.6	1 24 31.87	112.79	60.92		N. 3 15 51.7	680.6	
	Moon II.L.	- -	1 47 9.49	113.56	61.10		N. 5 30 51.8	+668.5	
	Moon II.U.	26.6	2 9 59.33	114.82	61.42		7 42 51.7	650.5	
27	Moon II.L.	- -	2 33 6.95	116.52	61.86		N. 9 50 38.9	+626.3	
	Moon II.U.	27.7	2 56 37.47	118.63	62.41		11 52 56.9	595.6	
28	Moon II.L.	- -	3 20 35.38	121.08	63.04		N. 13 48 25.7	+558.0	
	Moon II.U.	28.7	3 45 4.40	123.80	63.76		15 35 40.6	513.2	
29	Moon II.L.	- -	4 10 7.24	126.70	64.52		N. 17 13 13.2	+461.0	
30	Moon I.U.	0.1	4 33 34.86	129.54	65.30		N. 18 39 33.4	+401.2	
	Moon I.L.	- -	4 59 47.08	132.48	66.06		19 53 11.6	334.0	
31	Moon I.U.	1.1	5 26 33.57	135.23	66.78		N. 20 52 40.6	+259.7	
	Moon I.L.	- -	5 53 51.40	137.68	67.42		21 36 40.1	179.2	
June 1	Moon I.U.	2.2	6 21 36.26	139.71	67.95		N. 22 4 0.5	+93.4	
	Moon I.L.	- -	6 49 42.41	141.22	68.36		22 13 45.8	+3.6	
2	Moon I.U.	3.2	7 18 3.31	142.16	68.62		N. 22 5 18.0	- 88.5	
	Moon I.L.	- -	7 46 32.03	142.53	68.75		21 38 18.4	-181.4	
	$\kappa$ Geminor.	3.1	7 36 34.92				N. 24 42		



# 406 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
June 2	μ <sup>a</sup> Cancri - -	5½	<sup>h</sup> 8 <sup>m</sup> 0 <sup>s</sup> 6.01	.	.	N. 21 57	.	
3	κ Geminor.	3½	7 36 34.92			N. 24 42		
	μ <sup>a</sup> Cancri - -	5½	8 0 6.00			21 57		
	Moon I. U.	4.2	8 15 1.87	142.36	68.73	20 52 49.2	-273.2	
	Moon I. L.	- -	8 43 26.92	141.75	68.61	19 49 13.0	362.3	
	γ Cancri - -	6	8 25 10.61			20 53		
	γ Cancri - -	4½	8 35 45.01			N. 21 56		
4	γ Cancri - -	6	8 25 10.60			N. 20 53		
	γ Cancri - -	4½	8 35 45.00			21 56		
	Moon I. U.	5.3	9 11 42.51	140.81	68.40	18 28 11.9	-447.1	
	Moon I. L.	- -	9 39 45.61	139.69	68.14	16 50 44.7	526.4	
	ψ Leonis - -	6	9 36 38.69			14 37		
	ν Leonis - *	5	9 51 13.48			N. 13 4		
5	ψ Leonis - -	6	9 36 38.68			N. 14 37		
	ν Leonis - *	5	9 51 13.47			13 4		
	Moon I. U.	6.3	10 7 34.93	138.54	67.87	14 58 5.1	-599.0	
	Moon I. L.	- -	10 35 11.00	137.50	67.62	12 51 38.8	664.0	
	ρ Leonis - *	4	10 25 57.92			9 58		
	ι Leonis - *	5	10 42 25.41			N. 11 14		
6	ρ Leonis - *	4	10 25 57.90			N. 9 58		
	ι Leonis - *	5	10 42 25.40			11 14		
	Moon I. U.	7.3	11 2 35.98	136.71	67.43	10 33 2.7	-720.5	
	Moon I. L.	- -	11 29 53.56	136.29	67.32	8 4 3.3	767.8	
	σ Leonis - *	4	11 14 26.26			6 44		
	ν Virginis *	4½	11 39 11.27			N. 7 15		
7	σ Leonis - *	4	11 14 26.25			N. 6 44		
	ν Virginis *	4½	11 39 11.26			7 15		
	Moon I. U.	8.4	11 57 8.63	136.31	67.32	5 26 36.3	-805.0	
	Moon I. L.	- -	12 24 27.03	136.85	67.45	2 42 48.0	831.2	
	η Virginis -	3½	12 13 15.91			N. 0 3		
	γ <sup>2</sup> Virginis -	2½	12 35 5.19			S. 0 44		
8	η Virginis -	3½	12 13 15.90			N. 0 3		
	γ <sup>2</sup> Virginis -	2½	12 35 5.19			S. 0 44		
	Moon I. U.	9.4	12 51 55.32	137.96	67.71	0 5 5.7	-845.7	
	Moon I. L.	- -	13 19 40.26	139.63	68.12	2 54 36.6	847.3	
	θ Virginis -	4½	13 3 14.15			S. 4 51		
	ζ Virginis -	3½	13 28 5.28			N. 0 4		
9	θ Virginis -	4½	13 3 14.14			S. 4 51		
	ζ Virginis -	3½	13 28 5.28			N. 0 4		
	Moon I. U.	10.4	13 47 48.66	141.86	68.65	S. 5 43 4.6	-835.0	
	Moon I. L.	- -	14 16 26.71	144.56	69.31	8 27 37.9	808.0	
	κ Virginis -	4½	14 5 59.23			9 40		
	λ Virginis -	4½	14 12 6.11			S. 12 46		
10	κ Virginis -	4½	14 5 59.23			S. 9 40		
	λ Virginis -	4½	14 12 6.11			12 46		
	Moon I. U.	11.5	14 45 39.63	147.64	70.04	S. 11 5 14.6	-765.5	



# MOON-CULMINATING STARS, 1870. 407

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
June 10	Moon I. L.	- -	h m s	s	s	° ' "	"	
	♋ Libræ - -	4	15 15 30.91	150.93	70.81	S. 13 32 45.9	-707.1	
	♋ Libræ - -	4½	15 20 57.41			16 16		
	♋ Libræ - -	4½	15 28 17.03			S. 14 21		
11	♋ Libræ - -	4	15 20 57.41			S. 16 16		
	♋ Libræ - -	4½	15 28 17.03			14 21		
	Moon I. v.	12.5	15 46 1.76	154.20	71.59	15 47 2.5	-633.1	
	Moon I. L.	- -	16 17 10.50	157.19	72.29	17 45 2.4	544.5	
	♏ Scorpil - -	2	15 57 54.58			19 27		
	♏ Scorpil - -	4	16 4 28.41			S. 19 7		
12	♏ Scorpil - -	2	15 57 54.58			S. 19 27		
	♏ Scorpil - -	4	16 4 28.42			19 7		
	Moon I. v.	13.5	16 48 52.04	159.61	72.85	19 24 0.4	-443.2	
	Moon I. L.	- -	17 20 57.89	161.19	73.22	20 41 40.4	332.0	
	♎ Ophiuchi -	5	17 13 14.78			20 58		
	♎ Ophiuchi -	5	17 35 40.36			S. 21 37		
13	♎ Ophiuchi -	5	17 13 14.79			S. 20 58		
	♎ Ophiuchi -	5	17 35 40.38			21 37		
	Moon II. v.	14.6	17 55 43.04	161.69	73.33	21 36 24.4	-214.6	
	♐ Sagittarii	4	18 6 1.10			21 5		
	♐ Sagittarii	3	18 19 58.82			S. 25 29		
	14	♐ Sagittarii	4	18 6 1.11			S. 21 5	
♐ Sagittarii		3	18 19 58.84			25 29		
	Moon II. L.	- -	18 28 0.14	160.94	73.17	22 7 21.3	- 94.9	
	Moon II. v.	15.6	19 0 0.93	158.99	72.73	22 14 29.5	+ 22.9	
	♑ Sagittarii	4½	19 28 49.20			25 10		
	♑ Sagittarii	5	19 38 48.28			S. 20 4		
15	♑ Sagittarii	4½	19 28 49.23			S. 25 10		
	♑ Sagittarii	5	19 38 48.31			20 4		
	Moon II. L.	- -	19 31 31.50	155.93	72.03	21 58 34.9	+135.0	
	Moon II. v.	16.7	20 2 19.86	152.00	71.11	21 21 4.3	238.5	
	♑ Capricorni	5	20 21 27.86			18 14		
	♑ Capricorni	5½	20 32 40.21			S. 18 36		
16	♑ Capricorni	5	20 21 27.89			S. 18 14		
	♑ Capricorni	5½	20 32 40.24			18 36		
	Moon II. L.	- -	20 32 17.06	147.46	70.03	20 23 54.0	+331.3	
	Moon II. v.	17.7	21 1 17.50	142.59	68.85	19 9 19.4	412.4	
	♑ Capricorni	3½	21 32 54.35			17 15		
	♑ Capricorni	3	21 39 52.86			S. 16 43		
17	♑ Capricorni	3½	21 32 54.38			S. 17 15		
	♑ Capricorni	3	21 39 52.89			16 43		
	Moon II. L.	- -	21 29 18.94	137.66	67.64	17 39 43.3	+481.6	
	Moon II. v.	18.7	21 56 22.06	132.90	66.45	15 57 27.1	+539.2	
	♒ Aquarii -	6	22 17 30.07			14 11		
	♒ Aquarii -	4½	22 23 46.75			S. 11 20		
18	♒ Aquarii -	6	22 17 30.11			S. 14 11		
	♒ Aquarii -	4½	22 23 46.78			S. 11 20		



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
June 18	Moon II. L.	- -	<sup>h</sup> <sup>m</sup> <sup>s</sup> 22 22 29.90	128.47	65.32	<sup>°</sup> <sup>'</sup> <sup>"</sup> S. 14 4 45.4	<sup>"</sup> +586.0	
	Moon II. U.	19.8	22 47 47.24	124.50	64.29	12 3 41.8	623.1	
	ψ Aquarii -	4½	23 9 5.26			9 48		
	96 Aquarii -	5½	23 12 40.14			S. 5 50		
19	ψ Aquarii -	4½	23 9 5.29			S. 9 48		
	96 Aquarii -	5½	23 12 40.17			5 50		
	Moon II. L.	- -	23 12 20.07	121.07	63.38	9 56 7.0	+651.4	
	Moon II. U.	20.8	23 36 15.18	118.22	62.61	7 43 40.1	671.9	
	30 Piscium -	5	23 55 18.01			6 44		
	33 Piscium -	5	23 58 41.29			S. 6 26		
	30 Piscium -	5	23 55 18.04			S. 6 44		
	33 Piscium -	5	23 58 41.32			6 26		
	Moon II. L.	- -	23 59 39.71	115.97	62.00	5 27 49.1	+685.5	
	Moon II. U.	21.8	0 22 41.03	114.33	61.54	3 9 52.2	693.0	
	13 Ceti - - -	5½	0 28 33.64			4 18		
	20 Ceti - - -	5½	0 46 22.19			S. 1 51		
21	13 Ceti - - -	5½	0 28 33.68			S. 4 18		
	20 Ceti - - -	5½	0 46 22.22			1 51		
	Moon II. L.	- -	0 45 26.50	113.33	61.25	S. 0 51 1.5	+694.6	
	Moon II. U.	22.9	1 8 3.37	112.92	61.11	N. 1 27 36.1	690.8	
	μ Piscium *	5	1 23 22.51			5 28		
	ν Piscium *	4½	1 34 39.95			N. 4 50		
	μ Piscium *	5	1 23 22.54			N. 5 28		
	ν Piscium *	4½	1 34 39.98			4 50		
	Moon II. L.	- -	1 30 38.81	113.09	61.14	3 44 56.5	+681.7	
	Moon II. U.	23.9	1 53 19.69	113.82	61.32	5 59 55.5	667.2	
	ξ Ceti - - *	4½	2 6 6.45			8 14		
	ξ Ceti - - *	4	2 21 14.68			N. 7 53		
23	ξ Ceti - - *	4½	2 6 6.48			N. 8 14		
	ξ Ceti - - *	4	2 21 14.71			7 53		
	Moon II. L.	- -	2 16 12.62	115.09	61.64	8 11 28.2	+647.3	
	Moon II. U.	24.9	2 39 23.84	116.86	62.10	10 18 26.2	621.4	
	λ Ceti - - *	5½	2 52 44.88			8 23		
	ο Tauri - *	3½	3 17 48.78			N. 8 34		
	λ Ceti - - *	5½	2 52 44.91			N. 8 23		
	ο Tauri - *	3½	3 17 48.81			8 34		
	Moon II. L.	- -	3 2 59.09	119.09	62.67	12 19 36.6	+589.3	
	Moon II. U.	26.0	3 27 3.51	121.71	63.34	N. 14 13 41.4	550.4	
	25	Moon II. L.	- -	3 51 41.42	124.65	64.09	N. 15 59 17.2	+504.3
	Moon II. U.	27.0	4 16 56.01	127.81	64.90	17 34 55.1	450.7	
26	Moon II. L.	- -	4 42 49.24	131.07	65.72	N. 18 59 2.5	+389.2	
	Moon II. U.	28.0	5 9 21.38	134.28	66.53	20 10 5.2	319.9	
27	Moon II. L.	- -	5 36 31.05	137.29	67.28	N. 21 6 31.1	+243.2	
	Moon II. U.	29.1	6 4 14.91	139.94	67.95	21 46 54.3	159.6	
28	Moon I. L.	- -	6 30 10.76	142.02	68.49	N. 22 9 59.4	+ 70.4	



# MOON-CULMINATING STARS, 1870. 409

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of (°s Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of (°s R.A. in 1 hour of Long.	Sidereal Time of (°s Sem. pas. mer.	Declination.		
June 29	Moon I. U.	0.5	<sup>h</sup> 6 <sup>m</sup> 58 <sup>s</sup> 45.10	<sup>s</sup> 143.59	<sup>s</sup> 68.88	<sup>°</sup> N. 22 <sup>'</sup> 14 <sup>"</sup> 47.9	<sup>"</sup> - 22.9	
	Moon I. L.	-	7 27 34.18	144.47	69.11	22 0 41.5	118.4	
30	Moon I. U.	1.6	7 56 29.75	144.67	69.17	N. 21 27 25.2	- 214.1	
	Moon I. L.	-	8 25 23.77	144.23	69.08	20 35 10.1	307.9	
July 1	Moon I. U.	2.6	8 54 9.11	143.25	68.86	N. 19 24 31.6	- 397.7	
	Moon I. L.	-	9 22 40.19	141.88	68.55	17 56 27.9	481.8	
2	Moon I. U.	3.6	9 50 53.30	140.28	68.18	N. 16 12 16.5	- 558.8	
	Moon I. L.	-	10 18 46.73	138.63	67.79	14 13 31.0	627.4	
	α Leonis - *	1½	10 1 26.43			12 36		
	ρ Leonis - *	4	10 25 57.69			N. 9 58		
3	α Leonis - *	1½	10 1 26.43			N. 12 36		
	ρ Leonis - *	4	10 25 57.68			9 58		
	Moon I. U.	4.7	10 46 20.95	137.10	67.43	12 1 56.3	- 686.8	
	Moon I. L.	-	11 13 38.12	135.82	67.13	9 39 25.9	736.5	
	χ Leonis - *	5	10 58 18.55			8 2		
	ι Leonis - *	4	11 17 8.60			N. 11 15		
4	χ Leonis - *	5	10 58 18.54			N. 8 2		
	ι Leonis - *	4	11 17 8.59			11 15		
	Moon I. U.	5.7	11 40 42.09	134.92	66.92	7 7 59.9	- 776.1	
	Moon I. L.	-	12 7 38.02	134.49	66.83	4 29 43.0	805.0	
	π Virginis *	4½	11 54 12.99			7 20		
	ιι Virginis *	6	12 3 26.25			N. 6 32		
5	π Virginis *	4½	11 54 12.98			N. 7 20		
	ιι Virginis *	6	12 3 26.24			6 32		
	Moon I. U.	6.7	12 34 32.04	134.61	66.87	N. 1 46 44.3	- 822.9	
	Moon I. L.	-	13 1 30.94	135.31	67.06	S. 0 58 41.9	829.5	
	38 Virginis -	6	12 46 32.54			2 51		
	48 Virginis -	6	12 57 13.23			S. 2 58		
6	38 Virginis -	6	12 46 32.53			S. 2 51		
	48 Virginis -	6	12 57 13.22			2 58		
	Moon I. U.	7.8	13 28 41.83	136.61	67.39	3 44 16.6	- 824.3	
	Moon I. L.	-	13 56 11.83	138.49	67.86	6 27 34.4	806.6	
	94 Virginis -	6	13 59 25.97			8 16		
	ι Virginis -	4	14 9 13.26			S. 5 23		
7	94 Virginis -	6	13 59 25.96			S. 8 16		
	ι Virginis -	4	14 9 13.25			5 23		
	Moon I. U.	8.8	14 24 7.63	140.90	68.46	9 6 3.3	- 776.0	
	Moon I. L.	-	14 52 35.06	143.74	69.15	11 37 5.1	732.0	
	δ Libræ - -	5	14 54 3.12			8 0		
	β Libræ - -	2	15 10 2.18			S. 8 54		
8	δ Libræ - -	5	14 54 3.12			S. 8 0		
	β Libræ - -	2	15 10 2.17			8 54		
	Moon I. U.	9.9	15 21 38.54	146.87	69.90	13 57 56.8	- 674.3	
	Moon I. L.	-	15 51 20.39	150.10	70.67	16 5 54.2	- 603.0	
	θ Libræ - -	4½	15 46 27.36			16 21		
	ρ' Scorpii -	2	15 57 54.56			S. 19 27		



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of (C's R.A. in 1 hour of Long.	Sidereal Time of (C's Sem. pas. mer.	Declination.	Var. of (C's Dec. in 1 hour of Long.	
July 9	θ Libræ - -	4½	h m s 15 46 27.35	"	"	S. 16° 21'	"	"
	β <sup>2</sup> Scorpii - -	2	15 57 54.55	"	"	19 27	"	"
	Moon I. v.	10.9	16 21 40.48	153.20	71.39	17 58 16.7	-518.7	"
	Moon I. L.	- -	16 52 35.61	155.89	72.01	19 32 35.6	422.6	"
	η Ophiuchi-	2½	17 2 57.41	"	"	15 34	"	"
	ε Ophiuchi-	5	17 13 14.94	"	"	S. 20 58	"	"
	η Ophiuchi-	2½	17 2 57.40	"	"	S. 15 34	"	"
	ε Ophiuchi-	5	17 13 14.94	"	"	20 58	"	"
	Moon I. v.	11.9	17 23 59.22	157.90	72.46	20 46 42.1	-317.0	"
	Moon I. L.	- -	17 55 41.62	158.99	72.69	21 38 56.4	204.5	"
10	μ <sup>2</sup> Sagittarii	4	18 6 1.39	"	"	21 5	"	"
	λ Sagittarii	3	18 19 59.15	"	"	S. 25 29	"	"
	μ <sup>2</sup> Sagittarii	4	18 6 1.39	"	"	S. 21 5	"	"
	λ Sagittarii	3	18 19 59.15	"	"	25 29	"	"
	Moon I. v.	13.0	18 27 30.65	158.99	72.67	22 8 18.0	- 88.8	"
	Moon I. L.	- -	18 59 12.74	157.83	72.37	22 14 29.0	+ 26.6	"
	π Sagittarii	3	19 2 4.03	"	"	21 14	"	"
	ρ <sup>2</sup> Sagittarii	4	19 14 9.95	"	"	S. 18 5	"	"
	π Sagittarii	3	19 2 4.04	"	"	S. 21 14	"	"
	ρ <sup>2</sup> Sagittarii	4	19 14 9.96	"	"	18 5	"	"
12	Moon II. v.	14.0	19 32 57.71	155.44	71.82	21 57 56.4	+137.9	"
	σ Capricorni	5½	20 11 55.59	"	"	19 31	"	"
	ρ Capricorni	5	20 21 28.45	"	"	S. 18 14	"	"
	σ Capricorni	5½	20 11 55.61	"	"	S. 19 31	"	"
	ρ Capricorni	5	20 21 28.47	"	"	18 14	"	"
	Moon II. L.	- -	20 3 44.24	152.17	71.04	21 19 48.4	+242.0	"
	Moon II. v.	15.1	20 33 46.98	148.19	70.08	20 21 46.2	336.5	"
	θ Capricorni	4	20 58 40.25	"	"	17 45	"	"
	ι Capricorni	4½	21 15 2.26	"	"	S. 17 23	"	"
	θ Capricorni	4	20 58 40.27	"	"	S. 17 45	"	"
14	ι Capricorni	4½	21 15 2.29	"	"	17 23	"	"
	Moon II. L.	- -	21 2 58.89	143.75	69.00	19 5 55.5	+419.9	"
	Moon II. v.	16.1	21 31 16.06	139.11	67.87	17 34 35.4	491.4	"
	μ Capricorni	5	21 46 14.25	"	"	14 10	"	"
	ι Aquarii -	4	21 59 26.55	"	"	S. 14 30	"	"
	μ Capricorni	5	21 46 14.27	"	"	S. 14 10	"	"
	ι Aquarii -	4	21 59 26.57	"	"	14 30	"	"
	Moon II. L.	- -	21 58 37.61	134.51	66.72	15 50 8.6	+551.1	"
	Moon II. v.	17.1	22 25 5.24	130.15	65.62	13 54 55.4	599.3	"
	λ Aquarii -	4	22 45 51.32	"	"	8 16	"	"
15	λ <sup>2</sup> Aquarii -	5½	22 58 24.55	"	"	S. 8 24	"	"
	λ Aquarii -	4	22 45 51.35	"	"	S. 8 16	"	"
	λ <sup>2</sup> Aquarii -	5½	22 58 24.58	"	"	8 24	"	"
	Moon II. L.	- -	22 50 42.58	126.15	64.60	11 51 6.9	+637.1	"
	Moon II. v.	18.2	23 15 34.78	122.64	63.69	9 40 44.0	+665.3	"
	20 Piscium -	6	23 41 16.78	"	"	3 29	"	"
	27 Piscium -	5½	23 52 2.26	"	"	S. 4 16	"	"
	20 Piscium -	6	23 41 16.78	"	"	3 29	"	"
	27 Piscium -	5½	23 52 2.26	"	"	S. 4 16	"	"
	20 Piscium -	6	23 41 16.78	"	"	3 29	"	"



# MOON-CULMINATING STARS, 1870. 411

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.						
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.		
July 17	20 Piscium -	6	<sup>h</sup> <sup>m</sup> <sup>s</sup> 23 41 16.81	"	"	S. 3 29	"	"	
	27 Piscium -	5½	23 52 2.28			4 16			
	Moon II. L.	- -	23 39 47.98	119.66	62.92	7 25 35.0	+684.9		
	Moon II. U.	19.2	0 3 28.87	117.26	62.29	5 7 16.7	697.0		
	12 Ceti - - -	6	0 23 25.38			4 40			
	13 Ceti - - -	5½	0 28 34.48			S. 4 18			
	18	12 Ceti - - -	6	0 23 25.41			S. 4 40		
		13 Ceti - - -	5½	0 28 34.51			4 18		
		Moon II. L.	- -	0 26 44.58	115.46	61.81	2 47 15.1	+702.2	
		Moon II. U.	20.2	0 49 42.32	114.26	61.49	S. 0 26 47.9	701.3	
		33 Ceti - - -	6	1 3 53.22			N. 1 45		
		38 Ceti - - -	6	1 8 11.80			S. 1 40		
	19	33 Ceti - - -	6	1 3 53.25			N. 1 45		
		38 Ceti - - -	6	1 8 11.84			S. 1 40		
		Moon II. L.	- -	1 12 29.30	113.67	61.34	N. 1 52 54.3	+694.8	
Moon II. U.		21.3	1 35 12.73	113.67	61.34	4 10 45.4	682.9		
α Piscium -		3½	1 55 20.03			2 8			
β Ceti - - *		4½	2 6 7.28			N. 8 14			
20	α Piscium -	3½	1 55 20.06			N. 2 8			
	β Ceti - - *	4½	2 6 7.31			8 14			
	Moon II. L.	- -	1 57 59.60	114.24	61.50	6 25 41.5	+665.6		
	Moon II. U.	22.3	2 20 56.72	115.37	61.80	8 36 38.6	643.0		
	μ Ceti - - *	4	2 37 55.56			9 34			
	λ Ceti - - *	5½	2 52 45.67			N. 8 23			
	21	μ Ceti - - *	4	2 37 55.59			N. 9 34		
		λ Ceti - - *	5½	2 52 45.71			8 23		
Moon II. L.		- -	2 44 10.58	117.03	62.25	10 42 31.5	+614.9		
Moon II. U.		23.3	3 7 47.32	119.17	62.82	12 42 11.2	580.8		
f Tauri - *		4	3 23 42.33			12 29			
e Tauri - *		5	3 41 8.90			N. 10 45			
22	f Tauri - *	4	3 23 42.36			N. 12 29			
	e Tauri - *	5	3 41 8.93			10 45			
	Moon II. L.	- -	3 31 52.47	121.75	63.49	14 34 24.1	+540.3		
	Moon II. U.	24.4	3 56 30.86	124.70	64.25	16 17 51.4	493.0		
	α Tauri - -	3½	4 21 1.68			18 53			
	α Tauri - -	I	4 28 27.80			N. 16 15			
23	α Tauri - -	3½	4 21 1.71			N. 18 53			
	α Tauri - -	I	4 28 27.83			16 15			
	Moon II. L.	- -	4 21 46.35	127.92	65.07	17 51 8.2	+438.5		
	Moon II. U.	25.4	4 47 41.53	131.29	65.92	19 12 45.3	376.3		
	119 Tauri - -	5½	5 24 35.43			18 30			
	ζ Tauri - -	3½	5 29 52.45			N. 21 4			
24	119 Tauri - -	5½	5 24 35.46			N. 18 30			
	ζ Tauri - -	3½	5 29 52.48			21 4			
	Moon II. L.	- -	5 14 17.45	134.69	66.76	20 21 9.4	+306.4		
	Moon II. U.	26.4	5 41 33.40	137.93	67.56	N. 21 14 47.9	+228.8		



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.				
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.
July 25	Moon II. L.	- -	<sup>h</sup> <sup>m</sup> <sup>s</sup> 6 9 26.62	140.87	68.27	N. 21 52 11.8	+ 144.1
	Moon II. U.	27.4	6 37 52.46	143.34	68.87	22 12 1.3	+ 53.2
26	Moon II. L.	- -	7 6 44.37	145.20	69.31	N. 22 13 11.3	- 42.2
	Moon II. U.	28.5	7 35 54.49	146.36	69.58	21 54 57.0	140.5
27	Moon II. L.	- -	8 5 14.16	146.79	69.68	N. 21 16 58.5	- 239.2
28	Moon I. U.	0.0	8 32 15.51	146.55	69.62	N. 20 19 23.8	- 336.1
	Moon I. L.	- -	9 1 29.53	145.70	69.41	19 2 49.0	428.8
29	Moon I. U.	1.1	9 30 30.35	144.37	69.09	N. 17 28 17.8	- 515.2
	Moon I. L.	- -	9 59 13.31	142.75	68.70	15 37 17.8	593.3
30	Moon I. U.	2.1	10 27 35.88	141.01	68.29	N. 13 31 35.9	- 661.9
	Moon I. L.	- -	10 55 37.67	139.31	67.89	11 13 15.2	719.7
31	Moon I. U.	3.1	11 23 20.23	137.83	67.54	N. 8 44 28.2	- 766.1
	Moon I. L.	- -	11 50 46.84	136.68	67.28	6 7 35.1	800.7
	β Virginis -	3½	11 43 55.48			2 30	
	α Virginis *	4½	11 54 12.76			N. 7 20	
Aug. 1	β Virginis -	3½	11 43 55.48			N. 2 30	
	α Virginis *	4½	11 54 12.75			7 20	
	Moon I. U.	4.2	12 18 2.16	135.96	67.13	3 24 59.9	- 823.1
	Moon I. L.	- -	12 45 11.85	135.75	67.11	N. 0 39 8.5	833.4
	γ Virginis -	2½	12 35 4.64			S. 0 44	
	38 Virginis -	6	12 46 32.26			S. 2 51	
2	γ Virginis -	2½	12 35 4.63			S. 0 44	
	38 Virginis -	6	12 46 32.25			2 51	
	Moon I. U.	5.2	13 12 22.23	136.08	67.22	2 7 32.9	- 831.4
	Moon I. L.	- -	13 39 39.97	136.97	67.47	4 52 37.1	817.2
	δ Virginis -	5	13 25 13.15			5 35	
	80 Virginis -	6	13 28 46.15			S. 4 44	
3	δ Virginis -	5	13 25 13.14			S. 5 35	
	80 Virginis -	6	13 28 46.14			4 44	
	Moon I. U.	6.2	14 7 11.67	138.40	67.85	7 33 36.5	- 790.7
	Moon I. L.	- -	14 35 3.48	140.31	68.34	10 8 3.6	751.8
	ε Libræ - -	6	14 47 20.54			11 22	
	δ Libræ - -	5	14 54 2.83			S. 8 0	
4	ε Libræ - -	6	14 47 20.53			S. 11 22	
	δ Libræ - -	5	14 54 2.82			8 0	
	Moon I. U.	7.3	15 3 20.70	142.62	68.92	12 33 31.2	- 700.7
	Moon I. L.	- -	15 32 7.36	145.19	69.55	14 47 33.2	637.6
	γ Libræ - -	4½	15 28 16.67			14 21	
	θ Libræ - -	4½	15 46 27.09			S. 16 21	
5	γ Libræ - -	4½	15 28 16.66			S. 14 21	
	θ Libræ - -	4½	15 46 27.08			16 21	
	Moon I. U.	8.3	16 1 25.63	147.86	70.20	16 47 47.1	- 562.8
	Moon I. L.	- -	16 31 15.48	150.42	70.81	18 31 58.0	- 477.3
	φ Ophiuchi -	5	16 23 43.82			16 20	
	B.A.C. 5579	5	16 34 5.07			S. 17 29	



# MOON-CULMINATING STARS, 1870. 413

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Aug. 6	♄ Ophiuchi-	5	<sup>h</sup> 16 <sup>m</sup> 23 <sup>s</sup> 43.81	"	"	S. 16° 20'	"	"
	B.A.C. 5579	5	16 34 5.06			17 29		
	Moon I. U.	9.3	17 1 34.24	152.64	71.32	19 58 3.7	-382.2	
	Moon I. L.	-	17 32 16.47	154.29	71.68	21 4 20.2	279.4	
	♄ Ophiuchi-	3½	17 14 3.52			24 52		
	58 Ophiuchi-	5	17 35 40.48			S. 21 37		
7	♄ Ophiuchi-	3½	17 14 3.51			S. 24 52		
	58 Ophiuchi-	5	17 35 40.47			21 37		
	Moon I. U.	10.4	18 3 14.14	155.18	71.86	21 49 29.0	-171.4	
	Moon I. L.	-	18 34 17.10	155.15	71.82	22 12 43.3	- 60.8	
	♄ Sagittarii	4	18 50 0.56			21 16		
	♄ Sagittarii	4	18 56 55.72			S. 21 56		
8	♄ Sagittarii	4	18 50 0.55			S. 21 16		
	♄ Sagittarii	4	18 56 55.71			21 56		
	Moon I. U.	11.4	19 5 14.01	154.16	71.54	22 13 51.4	+ 49.1	
	Moon I. L.	-	19 35 53.23	152.22	71.04	21 53 18.1	155.5	
	♄ Sagittarii	4½	19 28 49.87			25 10		
	♄ Sagittarii	5	19 38 48.97			S. 20 4		
9	♄ Sagittarii	4½	19 28 49.87			S. 25 10		
	♄ Sagittarii	5	19 38 48.97			20 4		
	Moon I. U.	12.5	20 6 4.05	149.45	70.34	21 12 3.1	+255.7	
	Moon I. L.	-	20 35 37.50	146.03	69.48	20 11 35.3	347.4	
	♄ Capricorni	5	20 21 28.74			18 14		
	♄ Capricorni	5½	20 32 41.14			S. 18 36		
10	♄ Capricorni	5	20 21 28.74			S. 18 14		
	♄ Capricorni	5½	20 32 41.14			18 36		
	Moon I. U.	13.5	21 4 26.99	142.17	68.51	18 53 46.0	+429.1	
	♄ Capricorni	3½	21 32 55.52			17 15		
	♄ Capricorni	3	21 39 54.06			S. 16 43		
	♄ Capricorni	3½	21 32 55.53			S. 17 15		
11	♄ Capricorni	3	21 39 54.07			16 43		
	Moon II. L.	-	21 34 43.54	137.91	67.48	17 20 41.1	+499.9	
	Moon II. U.	14.6	22 1 53.73	133.81	66.44	15 34 33.3	559.5	
	♄ Aquarii -	4½	22 23 48.06			11 20		
	♄ Aquarii -	4	22 42 44.59			S. 14 16		
	♄ Aquarii -	4½	22 23 48.08			S. 11 20		
12	♄ Aquarii -	4	22 42 44.60			14 16		
	Moon II. L.	-	22 28 15.51	129.87	65.43	13 37 35.8	+608.2	
	Moon II. U.	15.6	22 53 51.67	126.22	64.49	11 31 57.5	646.5	
	♄ Aquarii -	4½	23 9 6.70			9 48		
	B.A.C. 8239	6	23 34 27.22			S. 12 24		
	♄ Aquarii -	4½	23 9 6.72			S. 9 48		
13	B.A.C. 8239	6	23 34 27.24			12 24		
	Moon II. L.	-	23 18 46.35	122.97	63.65	9 19 39.7	+675.0	
	Moon II. U.	16.6	23 43 4.78	120.18	62.92	7 2 33.8	+694.6	
	30 Piscium -	5	23 55 19.54			6 44		
	33 Piscium -	5	23 58 42.83			S. 6 26		



# 414 MOON-CULMINATING STARS, 1870.

At Greenwich Transit.									
Month and Day.	Name.	Magni- tude.	Apparent Right Ascension in Time.			Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.
Aug. 14	30 Piscium -	5	h m s					S. ° ' "	"
	33 Piscium -	5	23 55 19.56					6 44	
	Moon II. L.	-	23 58 42.85					6 26	
	Moon II. U.	17.6	0 6 52.80	117.91	62.33	4 42 22.1	+706.1		
	B.A.C. 221 *	6	0 30 16.72	116.17	61.89	S. 2 20 37.2	710.3		
	33 Ceti - - -	6	0 41 35.35			N. 4 37			
		6	1 3 53.97			N. 1 45			
15	B.A.C. 221 *	6	0 41 35.38			N. 4 37			
	33 Ceti - - -	6	1 3 53.99			1 45			
	Moon II. L.	-	0 53 23.07	114.98	61.59	0 1 17.4	+707.8		
	Moon II. U.	18.7	1 16 18.48	114.34	61.44	2 22 4.5	699.1		
	♄ Piscium *	4½	1 34 41.59			4 50			
	ξ Piscium -	4	1 46 51.08			N. 2 33			
16	♄ Piscium *	4½	1 34 41.61			N. 4 50			
	ξ Piscium -	4	1 46 51.11			2 33			
	Moon II. L.	-	1 39 9.51	114.26	61.44	4 40 32.9	+684.7		
	Moon II. U.	19.7	2 2 2.76	114.71	61.59	6 55 35.2	664.8		
	ξ Ceti - - *	4	2 21 16.33			7 53			
	μ Ceti - - *	4	2 37 56.37			N. 9 34			
17	ξ Ceti - - *	4	2 21 16.35			N. 7 53			
	μ Ceti - - *	4	2 37 56.40			9 34			
	Moon II. L.	-	2 25 4.59	115.68	61.88	9 6 5.1	+639.3		
	Moon II. U.	20.7	2 48 21.15	117.16	62.30	11 10 57.0	608.4		
	ξ Tauri - *	3½	3 20 8.68			9 17			
	f Tauri - *	4	3 23 43.15			N. 12 29			
18	ξ Tauri - *	3½	3 20 8.71			N. 9 17			
	f Tauri - *	4	3 23 43.18			12 29			
	Moon II. L.	-	3 11 58.28	119.11	62.84	13 9 3.7	+571.7		
	Moon II. U.	21.8	3 36 1.40	121.48	63.49	14 59 14.7	529.1		
	γ Tauri - -	4	4 12 24.79			15 19			
	δ Tauri - -	4	4 15 27.27			N. 17 14			
19	γ Tauri - -	4	4 12 24.82			N. 15 19			
	δ Tauri - -	4	4 15 27.30			17 14			
	Moon II. L.	-	4 0 35.23	124.22	64.22	16 40 16.1	+480.1		
	Moon II. U.	22.8	4 25 43.73	127.24	65.01	18 10 49.4	424.3		
	ι Tauri - -	5	4 55 20.39			21 24			
	π Tauri - -	5½	4 59 46.90			N. 18 28			
20	ι Tauri - -	5	4 55 20.42			N. 21 24			
	π Tauri - -	5½	4 59 46.93			18 28			
	Moon II. L.	-	4 51 29.81	130.46	65.84	19 29 31.7	+361.5		
	Moon II. U.	23.8	5 17 54.99	133.74	66.68	20 34 57.5	291.5		
	ζ Tauri - -	3½	5 29 53.25			21 4			
	χ Orionis -	4½	5 46 41.55			N. 20 15			
21	ζ Tauri - -	3½	5 29 53.28			N. 21 4			
	χ Orionis -	4½	5 46 41.58			20 15			
	Moon II. L.	-	5 44 59.32	136.95	67.47	21 25 39.6	+214.3		
	Moon II. U.	24.9	6 12 40.98	139.94	68.21	22 0 13.8	+130.3		
	α Geminor.	3½	6 35 56.40			N. 25 15			



# MOON-CULMINATING STARS, 1870. 415

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Aug. 21	♊ Geminor.	4	<sup>h</sup> 6 <sup>m</sup> 56 <sup>s</sup> 24.08	"	"	N. 20 45	"	
22	♊ Geminor.	3½	6 35 56.43			N. 25 15		
	♊ Geminor.	4	6 56 24.10			20 45		
	Moon II. L.	- -	6 40 56.46	142.56	68.84	22 17 21.9	+ 40.1	
	Moon II. U.	25.9	7 9 40.49	144.68	69.34	N. 22 15 56.8	- 55.0	
23	Moon II. L.	- -	7 38 46.38	146.20	69.68	N. 21 55 9.1	- 153.4	
	Moon II. U.	26.9	8 8 6.59	147.06	69.86	21 14 30.6	253.1	
24	Moon II. L.	- -	8 37 33.20	147.27	69.89	N. 20 13 58.7	- 351.9	
	Moon II. U.	28.0	9 6 58.84	146.91	69.78	18 53 59.6	447.2	
25	Moon II. L.	- -	9 36 17.10	146.07	69.56	N. 17 15 27.8	- 536.9	
	Moon II. U.	29.0	10 5 23.18	144.90	69.27	15 19 45.1	618.7	
26	Moon I. L.	- -	10 31 56.25	143.63	68.94	N. 13 8 38.3	- 690.6	
27	Moon I. U.	0.6	11 0 31.73	142.30	68.61	N. 10 44 15.4	- 751.2	
	Moon I. L.	- -	11 28 51.87	141.10	68.33	8 9 0.4	799.1	
28	Moon I. U.	1.7	11 56 59.08	140.16	68.11	N. 5 25 29.9	- 833.7	
	Moon I. L.	- -	12 24 57.19	139.59	68.00	N. 2 36 28.2	854.3	
29	Moon I. U.	2.7	12 52 50.92	139.44	67.99	S. 0 15 15.7	- 860.7	
	Moon I. L.	- -	13 20 45.69	139.76	68.10	3 6 51.1	852.9	
30	Moon I. U.	3.7	13 48 47.09	140.55	68.34	S. 5 55 28.8	- 831.1	
	Moon I. L.	- -	14 17 0.61	141.77	68.67	8 38 23.1	795.7	
	κ Virginis -	4½	14 5 58.36			9 40		
	λ Virginis -	4½	14 12 5.23			S. 12 46		
31	κ Virginis -	4½	14 5 58.35			S. 9 40		
	λ Virginis -	4½	14 12 5.22			12 46		
	Moon I. U.	4.8	14 45 31.10	143.37	69.10	11 12 52.4	- 747.1	
	Moon I. L.	- -	15 14 22.48	145.23	69.59	13 36 23.0	686.0	
	♋ Libræ - -	4	15 20 56.61			16 16		
	γ Libræ - -	4½	15 28 16.26			S. 14 21		
Sept. 1	♋ Libræ - -	4	15 20 56.60			S. 16 16		
	γ Libræ - -	4½	15 28 16.25			14 21		
	Moon I. U.	5.8	15 43 37.21	147.23	70.11	15 46 29.9	- 613.3	
	Moon I. L.	- -	16 13 15.97	149.21	70.60	17 40 59.6	530.0	
	♏ Scorp̄ii - -	2	15 57 53.88			19 27		
	ν Scorp̄ii - -	4	16 4 27.74			S. 19 7		
2	♏ Scorp̄ii - -	2	15 57 53.86			S. 19 27		
	ν Scorp̄ii - -	4	16 4 27.72			19 7		
	Moon I. U.	6.8	16 43 17.28	150.96	71.03	19 17 54.2	- 437.7	
	Moon I. L.	- -	17 13 37.44	152.31	71.35	20 35 34.8	338.0	
	θ Ophiuchi -	3½	17 14 3.13			24 52		
	β Ophiuchi -	5	17 18 27.48			S. 24 3		
3	θ Ophiuchi -	3½	17 14 3.11			S. 24 52		
	β Ophiuchi -	5	17 18 27.46			24 3		
	Moon I. U.	7.9	17 44 10.50	153.08	71.52	21 32 45.6	- 233.1	
	Moon I. L.	- -	18 14 48.57	153.13	71.51	S. 22 8 37.9	- 125.4	



# 416 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. per. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Sept. 3	$\mu^s$ Sagittarii	4	<sup>h</sup> 18 <sup>m</sup> 6 <sup>s</sup> 1.02	"	"	S. 21	5	"
	21 Sagittarii	5	18 17 38.26			20	37	
4	$\mu^s$ Sagittarii	4	18 6 1.00			S. 21	5	
	21 Sagittarii	5	18 17 38.25			20	37	
	Moon I. v.	8.9	18 45 22.58	152.39	71.30	22 22	53.4	- 17.4
	Moon I. L.	- -	19 15 42.82	150.85	70.89	22 15	43.8	+ 88.4
	$\pi$ Sagittarii	3	19 2 3.88			21	14	
	$\rho^s$ Sagittarii	4	19 14 9.86			S. 18	5	
5	$\pi$ Sagittarii	3	19 2 3.86			S. 21	14	
	$\rho^s$ Sagittarii	4	19 14 9.84			18	5	
	Moon I. v.	10.0	19 45 39.98	148.56	70.29	21 47	51.1	+ 189.4
	Moon I. L.	- -	20 15 5.90	145.66	69.54	21 0	23.8	283.8
	$\sigma$ Capricorni	5½	20 11 55.75			19	31	
	$\rho$ Capricorni	5	20 21 28.66			S. 18	14	
6	$\sigma$ Capricorni	5½	20 11 55.75			S. 19	31	
	$\rho$ Capricorni	5	20 21 28.66			18	14	
	Moon I. v.	11.0	20 43 54.08	142.31	68.67	19 54	51.8	+ 370.0
	Moon I. L.	- -	21 12 0.17	138.68	67.72	18 33	1.1	446.8
	$\theta$ Capricorni	4	20 58 40.63			17	45	
	$\iota$ Capricorni	4½	21 15 2.73			S. 17	23	
7	$\theta$ Capricorni	4	20 58 40.62			S. 17	45	
	$\iota$ Capricorni	4½	21 15 2.72			17	23	
	Moon I. v.	12.0	21 39 21.88	134.94	66.74	16 56	47.6	+ 513.7
	Moon I. L.	- -	22 5 58.95	131.26	65.78	15 8	12.6	570.4
	$\iota$ Aquarii -	4	21 59 27.20			14	30	
	$\epsilon^s$ Aquarii -	5½	22 3 42.88			S. 12	12	
8	$\iota$ Aquarii -	4	21 59 27.20			S. 14	30	
	$\epsilon^s$ Aquarii -	5½	22 3 42.88			12	12	
	Moon I. v.	13.1	22 31 52.95	127.78	64.85	13 9	17.0	+ 617.2
	Moon I. L.	- -	22 57 6.78	124.59	64.01	11 1	59.4	654.2
	$\lambda$ Aquarii -	4	22 45 52.16			8	16	
	$\psi^s$ Aquarii -	4½	23 9 7.02			S. 9	48	
9	$\lambda$ Aquarii -	4	22 45 52.16			S. 8	16	
	$\psi^s$ Aquarii -	4½	23 9 7.02			9	48	
	Moon II. v.	14.1	23 23 50.99	121.65	63.25	8 48	13.4	+ 682.0
	30 Piscium -	5	23 55 19.96			6	44	
	33 Piscium -	5	23 58 43.25			S. 6	26	
10	30 Piscium -	5	23 55 19.97			S. 6	44	
	33 Piscium -	5	23 58 43.26			6	26	
	Moon II. L.	- -	23 47 56.07	119.27	62.62	6 29	45.5	+ 701.2
	Moon II. v.	15.1	0 11 35.36	117.36	62.11	4 8	16.4	712.4
	12 Ceti - - -	6	0 23 26.58			4	40	
	13 Ceti - - -	5½	0 28 35.71			S. 4	18	
11	12 Ceti - - -	6	0 23 26.59			S. 4	40	
	13 Ceti - - -	5½	0 28 35.72			4	18	
	Moon II. L.	- -	0 34 54.58	115.93	61.73	S. 1 45	18.6	+ 716.1



# MOON-CULMINATING STARS, 1870. 41

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Sept. 11	Moon II.U.	16.2	<sup>h</sup> 0 <sup>m</sup> 57 <sup>s</sup> 59.53	<sup>s</sup> 114.98	<sup>s</sup> 61.49	N. <sup>°</sup> 0 <sup>'</sup> 37 <sup>"</sup> 41.3	+712.8	
	μ Piscium *	5	1 23 24.73			5 28		
	ν Piscium *	4½	1 34 42.19			N. 4 50		
12	μ Piscium *	5	1 23 24.75			N. 5 28		
	ν Piscium *	4½	1 34 42.21			4 50		
	Moon II.L.	- -	1 20 56.14	114.53	61.39	2 59 22.1	+702.9	
	Moon II.U.	17.2	1 43 50.20	114.56	61.43	5 18 26.7	686.9	
	ξ Ceti - - *	4½	2 6 8.77			8 14		
	ξ Ceti - - *	4	2 21 17.01			N. 7 53		
13	ξ Ceti - - *	4½	2 6 8.79			N. 8 14		
	ξ Ceti - - *	4	2 21 17.04			7 53		
	Moon II.L.	- -	2 6 47.56	115.07	61.60	7 33 42.8	+664.8	
	Moon II.U.	18.2	2 29 53.77	116.04	61.90	9 43 59.3	637.0	
	μ Ceti - - *	4	2 37 57.11			9 34		
	σ Arietis - -	6	2 44 21.16			N. 14 33		
14	μ Ceti - - *	4	2 37 57.13			N. 9 34		
	σ Arietis - -	6	2 44 21.18			14 33		
	Moon II.L.	- -	2 53 14.20	117.44	62.31	11 48 6.8	+603.3	
	Moon II.U.	19.3	3 16 53.90	119.24	62.83	13 44 55.6	563.8	
	e Tauri - *	5	3 41 10.52			10 45		
	λ Tauri - *	3½	3 53 30.58			N. 12 7		
15	e Tauri - *	5	3 41 10.54			N. 10 45		
	λ Tauri - *	3½	3 53 30.61			12 7		
	Moon II.L.	- -	3 40 57.41	121.40	63.45	15 33 15.1	+518.4	
	Moon II.U.	20.3	4 5 28.73	123.87	64.14	17 11 53.1	466.9	
	α Tauri - -	3½	4 21 3.37			18 53		
	α Tauri - -	1	4 28 29.45			N. 16 15		
16	α Tauri - -	3½	4 21 3.40			N. 18 53		
	α Tauri - -	1	4 28 29.48			16 15		
	Moon II.L.	- -	4 30 31.17	126.57	64.88	18 39 35.3	+409.1	
	Moon II.U.	21.3	4 56 7.02	129.42	65.65	19 55 5.9	344.9	
	119 Tauri - -	5½	5 24 37.05			18 30		
	ζ Tauri - -	3½	5 29 54.09			N. 21 4		
17	119 Tauri - -	5½	5 24 37.08			N. 18 30		
	ζ Tauri - -	3½	5 29 54.12			21 4		
	Moon II.L.	- -	5 22 17.51	132.33	66.41	20 57 7.6	+274.3	
	Moon II.U.	22.4	5 49 2.58	135.17	67.15	21 44 23.9	197.4	
	μ Geminor.	3	6 15 6.93			22 35		
	ν Geminor.	4½	6 21 15.80			N. 20 17		
18	μ Geminor.	3	6 15 6.96			N. 22 35		
	ν Geminor.	4½	6 21 15.83			20 17		
	Moon II.L.	- -	6 16 20.80	137.83	67.83	22 15 41.1	+114.5	
	Moon II.U.	23.4	6 44 9.28	140.20	68.42	22 29 50.9	+26.3	
	γ Geminor.	4	6 56 24.87			20 45		
	δ Geminor.	3½	7 12 22.34			N. 22 13		
19	γ Geminor.	4	6 56 24.90			N. 20 45		



# 418 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	"	"	° ' "	"	
Sept. 19	♊ Geminor.	3½	7 12 22.37			N.22 13		
	Moon II. L.	- -	7 12 23.95	142.17	68.90	22 25 54.5	- 66.3	
	Moon II. U.	24.4	7 40 59.60	143.68	69.26	22 3 6.6	162.1	
	♋ Cancri - -	5½	8 4 45.92			18 2		
	♋ Cancri - -	6	8 25 11.73			N.20 53		
20	♋ Cancri - -	5½	8 4 45.94			N.18 2		
	♋ Cancri - -	6	8 25 11.75			20 53		
	Moon II. L.	- -	8 9 50.41	144.70	69.48	21 20 58.3	- 259.4	
	Moon II. U.	25.5	8 38 50.35	145.21	69.58	N.20 19 21.4	356.5	
21	Moon II. L.	- -	9 7 53.74	145.29	69.57	N.18 58 31.3	- 451.3	
	Moon II. U.	26.5	9 36 55.79	145.00	69.47	17 19 6.8	541.8	
22	Moon II. L.	- -	10 5 52.87	144.48	69.31	N.15 22 13.4	- 625.8	
	Moon II. U.	27.5	10 34 42.84	143.84	69.13	13 9 21.2	701.3	
23	Moon II. L.	- -	11 3 25.21	143.23	68.95	N.10 42 23.6	- 766.4	
	Moon II. U.	28.6	11 32 0.94	142.76	68.82	8 3 36.1	819.3	
24	Moon II. L.	- -	12 0 32.45	142.54	68.76	N. 5 15 33.8	- 858.7	
25	Moon I. U.	0.2	12 26 45.67	142.64	68.79	N. 2 21 7.2	- 883.2	
	Moon I. L.	- -	12 55 19.76	143.11	68.92	S. 0 36 40.3	892.0	
26	Moon I. U.	1.3	13 24 1.95	143.99	69.16	S. 3 34 36.7	- 884.6	
	Moon I. L.	- -	13 52 56.98	145.25	69.49	6 29 26.0	860.8	
27	Moon I. U.	2.3	14 22 9.16	146.83	69.91	S. 9 17 52.2	- 820.9	
	Moon I. L.	- -	14 51 41.89	148.66	70.39	11 56 44.9	765.4	
28	Moon I. U.	3.3	15 21 37.29	150.58	70.90	S.14 23 3.2	- 695.4	
	Moon I. L.	- -	15 51 55.61	152.45	71.39	16 34 2.1	612.4	
	♏ Scorpil - -	2	15 57 53.45			19 27		
	♏ Scorpil - -	4	16 4 27.30			S.19 7		
29	♏ Scorpil - -	2	15 57 53.44			S.19 27		
	♏ Scorpil - -	4	16 4 27.28			19 7		
	Moon I. U.	4.4	16 22 35.00	154.06	71.81	18 27 17.0	- 518.4	
	Moon I. L.	- -	16 53 31.29	155.23	72.11	20 0 48.6	415.6	
29	♏ Ophiuchi-	6	16 54 15.94			18 41		
	♏ Ophiuchi-	2½	17 2 56.39			S.15 34		
30	♏ Ophiuchi-	6	16 54 15.92			S.18 41		
	♏ Ophiuchi-	2½	17 2 56.37			15 34		
	Moon I. U.	5.4	17 24 38.15	155.79	72.27	21 13 7.4	- 306.7	
	Moon I. L.	- -	17 55 47.32	155.60	72.23	22 3 17.4	194.6	
	♐ Sagittarii	4	18 6 0.54			21 5		
	♐ Sagittarii	5	18 17 37.79			S.20 37		
Oct. 1	♐ Sagittarii	4	18 6 0.53			S.21 5		
	♐ Sagittarii	5	18 17 37.77			20 37		
	Moon I. U.	6.4	18 26 49.33	154.59	71.99	22 30 56.8	- 82.2	
	Moon I. L.	- -	18 57 34.33	152.77	71.54	22 36 18.5	+ 27.9	
	♐ Sagittarii	4	18 49 59.83			21 16		
	♐ Sagittarii	3	19 2 3.43			S.21 14		



# MOON-CULMINATING STARS, 1870. 419

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
Oct. 2	♏ Sagittarii	4	<sup>h</sup> 18 <sup>m</sup> 49 <sup>s</sup> 59.82	"	"	S. 21° 16'	"	
	♏ Sagittarii	3	19 2 3.41			21 14		
	Moon I. v.	7.5	19 27 52.90	150° 21	70° 90	22 20 6.3	+133° 1	
	Moon I. L.	- -	19 57 37.00	147° 05	70° 10	21 43 30.9	231° 5	
	♏ Sagittarii	5	19 38 48.39			20 4		
	57 Sagittarii	5½	19 44 40.39			S. 19 22		
	3	♏ Sagittarii	5	19 38 48.37			S. 20 4	
		57 Sagittarii	5½	19 44 40.38			19 22	
		Moon I. v.	8.5	20 26 40.34	143° 45	69° 18	20 48 3.4	+321° 6
		Moon I. L.	- -	20 54 58.82	139° 60	68° 18	19 35 29.4	402° 5
		♐ Capricorni	4	20 58 40.35			17 45	
		♐ Capricorni	4½	21 15 2.48			S. 17 23	
	4	♐ Capricorni	4	20 58 40.34			S. 17 45	
		♐ Capricorni	4½	21 15 2.47			17 23	
		Moon I. v.	9.6	21 22 30.53	135° 69	67° 15	18 7 42.5	+473° 7
		Moon I. L.	- -	21 49 15.59	131° 85	66° 13	16 26 39.7	535° 1
		♐ Capricorni	5	21 35 25.97			19 27	
		♐ Capricorni	3	21 39 53.98			S. 16 43	
	5	♐ Capricorni	5	21 35 25.96			S. 19 27	
		♐ Capricorni	3	21 39 53.97			16 43	
		Moon I. v.	10.6	22 15 15.83	128° 23	65° 15	14 34 17.5	+587° 0
		Moon I. L.	- -	22 40 34.45	124° 93	64° 25	12 32 29.1	629° 6
		♑ Aquarii -	4	22 42 44.81			14 16	
		74 Aquarii -	6	22 46 40.36			S. 12 18	
	6	♑ Aquarii -	4	22 42 44.81			S. 14 16	
		74 Aquarii -	6	22 46 40.35			12 18	
		Moon I. v.	11.6	23 5 15.66	122° 01	63° 44	10 23 2.7	+663° 4
		Moon I. L.	- -	23 29 24.35	119° 52	62° 75	8 7 41.7	688° 8
		B.A.C. 8239	6	23 34 27.69			12 24	
		B.A.C. 8266	6	23 40 36.33			S. 12 38	
7	B.A.C. 8239	6	23 34 27.69			S. 12 24		
	B.A.C. 8266	6	23 40 36.33			12 38		
	Moon I. v.	12.7	23 53 5.93	117° 49	62° 18	5 48 3.6	+706° 3	
	Moon I. L.	- -	0 16 26.02	115° 94	61° 74	3 25 40.7	716° 3	
	12 Ceti - - -	6	0 23 26.79			4 40		
	13 Ceti - - -	5½	0 28 35.92			S. 4 18		
8	12 Ceti - - -	6	0 23 26.79			S. 4 40		
	13 Ceti - - -	5½	0 28 35.92			4 18		
	Moon I. v.	13.7	0 39 30.34	114° 86	61° 44	S. 1 2 0.7	+719° 2	
	33 Ceti - - -	6	1 3 54.84			N. 1 45		
	38 Ceti - - -	6	1 8 13.45			S. 1 40		
	9	33 Ceti - - -	6	1 3 54.85			N. 1 45	
38 Ceti - - -		6	1 8 13.46			S. 1 40		
Moon II. L.		- -	1 4 27.21	114° 25	61° 28	N. 1 21 32.7	+715° 2	
Moon II. v.		14.7	1 27 17.06	114° 14	61° 25	3 43 38.7	+704° 7	
♓ Piscium *		4	1 38 34.55			8 30		
♓ Ceti - - *		4½	2 6 9.22			N. 8 14		



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of (s R.A. in 1 hour of Long.	Sidereal Time of (s Sem. pas. mer.	Declination.	Var. of (s Dec. in 1 hour of Long.	
Oct. 10	♋ Piscium *	4	<sup>h</sup> 1 <sup>m</sup> 38 <sup>s</sup> 34.56			N. 8° 30'		
	♎ Ceti - - *	4½	2 6 9.24			8 14		
	Moon II.L.	- -	1 50 8.29	114.47	61.35	6 2 59.2	+687.7	
	Moon II.U.	15.8	2 13 6.15	115.24	61.58	8 18 17.9	664.4	
	♈ Arietis - *	6	2 29 35.35			11 53		
	♎ Ceti - - *	4	2 37 57.63			N. 9 34		
	11	♈ Arietis - *	6	2 29 35.37			N. 11 53	
		♎ Ceti - - *	4	2 37 57.65			9 34	
		Moon II.L.	- -	2 36 15.59	116.40	61.92	10 28 19.2	+634.8
		Moon II.U.	16.8	2 59 41.22	117.93	62.36	12 31 48.4	599.0
♌ Tauri - *		4	3 23 44.57			12 29		
12	♌ Tauri - *	5	3 41 11.17			N. 10 45		
	♌ Tauri - *	4	3 23 44.59			N. 12 29		
	♌ Tauri - *	5	3 41 11.19			10 45		
	Moon II.L.	- -	3 23 27.20	119.78	62.89	14 27 31.2	+557.0	
	Moon II.U.	17.8	3 47 37.08	121.91	63.50	16 14 12.6	508.8	
	♌ Tauri - -	3½	4 21 4.11			18 53		
	♌ Tauri - -	1	4 28 30.20			N. 16 15		
	13	♌ Tauri - -	3½	4 21 4.14			N. 18 53	
		♌ Tauri - -	1	4 28 30.23			16 15	
		Moon II.L.	- -	4 12 13.74	124.23	64.16	17 50 38.1	+454.4
Moon II.U.		18.8	4 37 19.20	126.69	64.85	19 15 32.8	393.7	
♌ Tauri - -		5	4 55 22.06			21 24		
14	♌ Tauri - -	5½	5 0 9.31			N. 20 15		
	♌ Tauri - -	5	4 55 22.09			N. 21 24		
	♌ Tauri - -	5½	5 0 9.34			20 15		
	Moon II.L.	- -	5 2 54.55	129.20	65.55	20 27 44.0	+327.1	
	Moon II.U.	19.9	5 28 59.85	131.66	66.22	21 26 0.3	254.7	
	♊ Geminor.	3½	6 7 3.93			22 33		
	♊ Geminor.	3	6 15 7.79			N. 22 35		
	15	♊ Geminor.	3½	6 7 3.96			N. 22 33	
		♊ Geminor.	3	6 15 7.82			22 35	
		Moon II.L.	- -	5 55 33.94	133.99	66.86	22 9 14.1	+176.8
Moon II.U.		20.9	6 22 34.62	136.08	67.42	22 36 23.4	94.0	
♊ Geminor.		3½	6 35 58.12			25 15		
16	♊ Geminor.	4	6 56 25.71			N. 20 45		
	♊ Geminor.	3½	6 35 58.15			N. 25 15		
	♊ Geminor.	4	6 56 25.74			20 45		
	Moon II.L.	- -	6 49 58.65	137.86	67.90	22 46 34.4	+ 7.2	
	Moon II.U.	21.9	7 17 41.92	139.28	68.28	22 39 3.5	- 82.8	
	♋ Geminor.	3½	7 36 37.42			24 42		
	♋ Cancrī - -	6	7 53 5.34			N. 25 45		
	17	♋ Geminor.	3½	7 36 37.45			N. 24 42	
		♋ Cancrī - -	6	7 53 5.37			25 45	
		Moon II.L.	- -	7 45 39.88	140.31	68.54	22 13 18.6	-174.9
Moon II.U.		23.0	8 13 47.79	140.94	68.70	21 29 2.7	-267.8	
♋ Cancrī - -		6	8 25 12.53			N. 20 53		



# MOON-CULMINATING STARS, 1870. 42

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
Oct. 17	γ Cancri - -	4½	<sup>h</sup> 8 <sup>m</sup> 35 <sup>s</sup> 46·85	"	"	N. 21° 56'	"	
18	η Cancri - -	6	8 25 12·56			N. 20 53		
	γ Cancri - -	4½	8 35 46·88			21 56		
	Moon II. L.	- -	8 42 1·15	141·23	68·76	20 26 14·5	-360·0	
	Moon II. U.	24·0	9 10 16·19	141·23	68·75	19 5 10·1	450·2	
	λ Leonis - -	4½	9 24 18·97			23 32		
	σ Leonis - -	3	9 38 28·92			N. 24 22		
19	λ Leonis - -	4½	9 24 18·99			N. 23 32		
	σ Leonis - -	3	9 38 28·95			24 22		
	Moon II. L.	- -	9 38 30·04	141·05	68·68	17 26 23·6	-536·8	
	Moon II. U.	25·1	10 6 41·11	140·79	68·59	15 30 47·6	618·2	
	ρ Leonis - *	4	10 25 58·50			9 58		
	ι Leonis - *	5	10 42 25·82			N. 11 14		
20	ρ Leonis - *	4	10 25 58·52			N. 9 58		
	ι Leonis - *	5	10 42 25·84			11 14		
	Moon II. L.	- -	10 34 49·20	140·57	68·51	13 19 34·2	-692·8	
	Moon II. U.	26·1	11 2 55·39	140·50	68·45	N. 10 54 14·4	758·9	
21	Moon II. L.	- -	11 31 2·18	140·68	68·47	N. 8 16 40·1	-814·9	
	Moon II. U.	27·1	11 59 13·15	141·21	68·57	5 29 3·0	859·1	
22	Moon II. L.	- -	12 27 32·78	142·14	68·78	N. 2 33 54·8	-889·8	
	Moon II. U.	28·2	12 56 6·21	143·51	69·10	S. 0 25 52·8	905·5	
23	Moon II. L.	- -	13 24 58·76	145·33	69·54	S. 3 27 10·9	-904·7	
	Moon II. U.	29·2	13 54 15·61	147·55	70·08	6 26 35·3	886·4	
24	Moon I. L.	- -	14 21 39·76	149·99	70·72	S. 9 20 31·7	-849·9	
25	Moon I. U.	0·9	14 51 55·87	152·72	71·39	S. 12 5 21·6	-795·3	
	Moon I. L.	- -	15 22 45·06	155·47	72·08	14 37 30·3	723·2	
26	Moon I. U.	1·9	15 54 6·23	158·00	72·71	S. 16 53 35·8	-635·1	
	Moon I. L.	- -	16 25 55·29	160·08	73·24	18 50 38·4	533·2	
27	Moon I. U.	2·9	16 58 5·22	161·44	73·59	S. 20 26 11·2	-420·7	
	Moon I. L.	- -	17 30 26·10	161·87	73·72	21 38 27·6	301·2	
28	Moon I. U.	4·0	18 2 45·96	161·25	73·60	S. 22 26 27·3	-178·6	
	Moon I. L.	- -	18 34 51·85	159·54	73·22	22 49 58·3	- 57·0	
	♏ Sagittarii	4	18 49 59·37			21 16		
	♏ Sagittarii	4	18 56 54·54			S. 21 56		
29	♏ Sagittarii	4	18 49 59·35			S. 21 16		
	♏ Sagittarii	4	18 56 54·52			21 56		
	Moon I. U.	5·0	19 6 30·96	156·82	72·58	22 49 33·6	+ 60·1	
	Moon I. L.	- -	19 37 32·07	153·24	71·73	22 26 25·4	169·8	
	♏ Sagittarii	4½	19 28 48·75			25 10		
	♏ Sagittarii	5	19 38 47·92			S. 20 4		
30	♏ Sagittarii	4½	19 28 48·74			S. 25 10		
	♏ Sagittarii	5	19 38 47·91			20 4		
	Moon I. U.	6·1	20 7 46·32	149·05	70·71	21 42 15·5	+270·1	
	Moon I. L.	- -	20 37 7·71	144·48	69·58	S. 20 39 5·3	+359·7	



# 422 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of G's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of G's R.A. in 1 hour of Long.	Sidereal Time of G's Sem. per mer.	Declination.		
Oct. 30	♄ Capricorni	5	<sup>h</sup> 20 <sup>m</sup> 21 <sup>s</sup> 27.87	"	"	S. 18 14	"	"
	♄ Capricorni	5½	20 32 40.32			18 36		
	♄ Capricorni	5	20 21 27.85			S. 18 14		
	♄ Capricorni	5½	20 32 40.30			18 36		
	Moon I. U.	7.1	21 5 33.24	139.78	68.39	19 19 6.8	+438.2	
	Moon I. L.	-	21 33 2.69	135.16	67.21	17 44 33.5	505.6	
	♄ Capricorni	5	21 35 25.59			19 27		
	♄ Capricorni	3	21 39 53.61			S. 16 43		
	♄ Capricorni	5	21 35 25.57			S. 19 27		
	♄ Capricorni	3	21 39 53.60			16 43		
Nov. 1	Moon I. U.	8.1	21 59 38.09	130.79	66.05	15 57 35.4	+562.4	
	Moon I. L.	-	22 25 23.20	126.80	64.98	14 0 16.2	609.2	
	♄ Aquarii	-	22 17 31.17			14 11		
	♄ Aquarii	4½	22 23 47.89			S. 11 20		
	♄ Aquarii	6	22 17 31.15			S. 14 11		
	♄ Aquarii	4½	22 23 47.88			11 20		
	Moon I. U.	9.2	22 50 23.13	123.27	64.01	11 54 30.3	+646.9	
	Moon I. L.	-	23 14 43.73	120.25	63.17	9 42 3.3	676.2	
	♄ Aquarii	4½	23 7 37.61			6 45		
	♄ Aquarii	4½	23 11 11.04			S. 9 53		
	♄ Aquarii	4½	23 7 37.60			S. 6 45		
	♄ Aquarii	4½	23 11 11.03			9 53		
	Moon I. U.	10.2	23 38 31.32	117.78	62.47	7 24 32.1	+697.7	
	Moon I. L.	-	0 1 52.52	115.85	61.91	5 3 26.5	712.0	
	♄ Piscium	5	23 55 19.99			6 44		
	♄ Piscium	5	23 58 43.30			S. 6 26		
	♄ Piscium	5	23 55 19.98			S. 6 44		
	♄ Piscium	5	23 58 43.29			6 26		
	Moon I. U.	11.3	0 24 53.87	114.47	61.50	2 40 11.1	+719.5	
	Moon I. L.	-	0 47 41.94	113.63	61.24	0 16 5.2	720.4	
	B.A.C. 174	6	0 34 7.34			5 4		
	20 Ceti	5½	0 46 24.60			S. 1 51		
	B.A.C. 174	6	0 34 7.33			S. 5 4		
	20 Ceti	5½	0 46 24.59			S. 1 51		
	Moon I. U.	12.3	1 10 23.02	113.30	61.13	N. 2 7 33.8	+715.0	
	Moon I. L.	-	1 33 3.15	113.47	61.16	4 29 30.4	703.4	
	♄ Piscium *	4½	1 34 42.74			4 50		
	♄ Piscium *	4	1 38 34.71			N. 8 30		
	♄ Piscium *	4½	1 34 42.74			N. 4 50		
	♄ Piscium *	4	1 38 34.71			8 30		
	Moon I. U.	13.3	1 55 48.14	114.10	61.32	6 48 29.6	+685.5	
	Moon I. L.	-	2 18 43.39	115.17	61.60	9 3 16.0	+661.2	
	♄ Ceti	4½	2 6 9.46			8 14		
	♄ Ceti	4	2 21 17.78			N. 7 53		
	♄ Ceti	4½	2 6 9.46			N. 8 14		
	♄ Ceti	4	2 21 17.79			N. 7 53		



# MOON-CULMINATING STARS, 1870. 42.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
Nov. 7	Moon I. U.	14.3	<sup>h</sup> 2 41 <sup>m</sup> 53 <sup>s</sup> 85	116.63	62.00	N. 11 12 33.0	+630.5	
	o Tauri - *	3½	3 17 52.18			8 34		
	f Tauri - *	4	3 23 45.00			N. 12 29		
8	o Tauri - *	3½	3 17 52.19			N. 8 34		
	f Tauri - *	4	3 23 45.01			12 29		
	Moon II. L.	-	3 7 28.90	118.52	62.49	13 15 2.8	+593.3	
	Moon II. U.	15.3	3 31 23.51	120.62	63.07	15 9 26.6	549.5	
	λ Tauri - *	3½	3 53 31.78			12 7		
	γ Tauri - -	4	4 12 26.90			N. 15 19		
9	λ Tauri - *	3½	3 53 31.79			N. 12 7		
	γ Tauri - -	4	4 12 26.91			15 19		
	Moon II. L.	-	3 55 44.58	122.92	63.70	16 54 24.3	+499.0	
	Moon II. U.	16.4	4 20 34.13	125.35	64.37	18 28 36.3	441.9	
	τ Tauri - -	4½	4 34 29.86			22 42		
	ι Tauri - -	5	4 55 22.73			N. 21 24		
10	τ Tauri - -	4½	4 34 29.88			N. 22 42		
	ι Tauri - -	5	4 55 22.76			21 24		
	Moon II. L.	-	4 45 53.09	127.81	65.04	19 50 43.6	+378.3	
	Moon II. U.	17.4	5 11 41.22	130.19	65.70	20 59 30.7	308.6	
	ζ Tauri - -	3½	5 29 55.67			21 4		
	χ <sup>1</sup> Orionis -	4½	5 46 44.00			N. 20 15		
11	ζ Tauri - -	3½	5 29 55.70			N. 21 4		
	χ <sup>1</sup> Orionis -	4½	5 46 44.02			20 15		
	Moon II. L.	-	5 37 57.01	132.40	66.31	21 53 46.7	+233.2	
	Moon II. U.	18.5	6 4 37.79	134.34	66.85	22 32 27.9	152.9	
	μ Geminor.	3	6 15 8.63			22 35		
	ν Geminor.	4½	6 21 17.49			N. 20 17		
12	μ Geminor.	3	6 15 8.66			N. 22 35		
	ν Geminor.	4½	6 21 17.51			20 17		
	Moon II. L.	-	6 31 39.75	135.92	67.30	22 54 40.5	+68.6	
	Moon II. U.	19.5	6 58 58.30	137.10	67.64	22 59 42.1	-18.7	
	λ Geminor.	3½	7 10 39.91			16 46		
	63 Geminor.	5½	7 20 3.95			N. 21 43		
13	λ Geminor.	3½	7 10 39.94			N. 16 46		
	63 Geminor.	5½	7 20 3.98			21 43		
	Moon II. L.	-	7 26 28.35	137.84	67.86	22 47 3.9	-107.9	
	Moon II. U.	20.5	7 54 4.68	138.15	67.98	22 16 31.5	197.5	
	η Cancri - -	6	8 25 13.41			20 53		
	γ Cancri - -	4½	8 35 47.74			N. 21 56		
14	η Cancri - -	6	8 25 13.45			N. 20 53		
	γ Cancri - -	4½	8 35 47.78			21 56		
	Moon II. L.	-	8 21 42.47	138.09	67.99	21 28 6.0	-286.5	
	Moon II. U.	21.6	8 49 17.60	137.73	67.92	20 22 3.1	-373.6	
	ξ Cancri - -	5	9 1 54.89			22 34		
	λ Leonis - -	4½	9 24 19.84			N. 23 32		
15	ξ Cancri - -	5	9 1 54.92			N. 22 34		



# 424 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.	Var. of C's Dec. in 1 hour of Long.	
			h m s	"	"	° ' "	"	"
Nov. 15	λ Leonis - -	4½	9 24 19.88			N. 23 32		
	Moon II. L.	- -	9 16 47.17	137.18	67.79	18 58 52.5		-457.6
	Moon II. U.	22.6	9 44 9.58	136.55	67.64	17 19 18.0		537.4
	α Leonis - *	1½	10 1 28.30			12 36		
	37 Leonis - -	6	10 9 43.48			N. 14 22		
16	α Leonis - *	1½	10 1 28.33			N. 12 36		
	37 Leonis - -	6	10 9 43.51			14 22		
	Moon II. L.	- -	10 11 24.62	135.97	67.49	15 24 15.6		-612.1
	Moon II. U.	23.6	10 38 33.64	135.57	67.37	13 14 53.5		680.5
	χ Leonis - *	5	10 58 19.77			8 2		
17	ι Leonis - *	4	11 17 9.64			N. 11 15		
	χ Leonis - *	5	10 58 19.80			N. 8 2		
	ι Leonis - *	4	11 17 9.67			11 15		
	Moon II. L.	- -	11 5 39.43	135.45	67.32	10 52 32.9		-741.7
	Moon II. U.	24.7	11 32 46.05	135.72	67.37	8 18 47.2		794.5
18	π Virginis *	4½	11 54 13.65			7 20		
	ο Virginis *	4	11 58 36.18			N. 9 27		
	π Virginis *	4½	11 54 13.68			N. 7 20		
	ο Virginis *	4	11 58 36.21			9 27		
	Moon II. L.	- -	11 59 58.67	136.47	67.53	5 35 24.8		-837.6
19	Moon II. U.	25.7	12 27 23.36	137.74	67.83	N. 2 44 29.7		869.6
	Moon II. L.	- -	12 55 6.77	139.59	68.26	S. 0 11 36.0		-889.1
	Moon II. U.	26.7	13 23 15.78	142.02	68.84	3 10 10.7		894.2
	Moon II. L.	- -	13 51 57.30	144.99	69.56	S. 6 8 14.1		-883.5
	Moon II. U.	27.8	14 21 17.43	148.43	70.39	9 2 26.5		855.5
20	Moon II. L.	- -	14 51 20.99	152.20	71.29	S. 11 49 12.9		-809.1
	Moon II. U.	28.8	15 22 10.76	156.09	72.22	14 24 49.3		743.8
	Moon II. L.	- -	15 53 46.62	159.83	73.11	S. 16 45 30.6		-660.1
	Moon I. U.	0.5	16 23 37.07	162.98	73.90	S. 18 47 44.2		-559.5
	Moon I. L.	- -	16 56 28.73	165.46	74.49	20 28 22.5		444.8
21	Moon I. U.	1.5	17 29 43.77	166.83	74.82	S. 21 44 57.9		-319.8
	Moon I. L.	- -	18 3 7.30	166.85	74.85	22 35 55.2		189.3
	Moon I. U.	2.5	18 36 22.54	165.44	74.54	S. 23 0 38.1		- 58.3
	Moon I. L.	- -	19 9 12.49	162.66	73.92	22 59 30.8		+ 68.4
	Moon I. U.	3.6	19 41 21.91	158.73	73.01	S. 22 33 49.8		+186.7
22	Moon I. L.	- -	20 12 38.68	153.95	71.89	21 45 34.8		293.7
	ρ Capricorni	5	20 21 27.50			18 14		
	υ Capricorni	5½	20 32 39.94			S. 18 36		
	ρ Capricorni	5	20 21 27.49			S. 18 14		
	υ Capricorni	5½	20 32 39.94			18 36		
23	Moon I. U.	4.6	20 42 54.57	148.65	70.61	20 37 11.5		+387.9
	Moon I. L.	- -	21 12 5.40	143.16	69.27	19 11 18.8		+468.6
	θ Capricorni	4	20 58 39.54			17 45		
	ι Capricorni	4½	21 15 1.69			S. 17 23		



# MOON-CULMINATING STARS, 1870. 425

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
Nov. 28	θ Capricorni	4	<sup>h</sup> 20 <sup>m</sup> 58 <sup>s</sup> 39.53	"	"	S. 17 45	"	
	ι Capricorni	4½	21 15 1.68			17 23		
	Moon I. U.	5.7	21 40 10.68	137.76	67.92	17 30 37.8	+536.1	
	Moon I. L.	- -	22 7 12.92	132.68	66.63	15 37 42.0	591.2	
	ι Aquarii	4	21 59 26.34			14 30		
	45 Aquarii	6	22 12 3.66			S. 13 57		
	ι Aquarii	4	21 59 26.33			S. 14 30		
	45 Aquarii	6	22 12 3.65			13 57		
	Moon I. U.	6.7	22 33 16.81	128.06	65.42	13 34 53.0	+635.2	
	Moon I. L.	- -	22 58 28.57	124.00	64.34	11 24 18.0	669.1	
	ι Aquarii	5½	22 58 24.89			8 24		
	ψ Aquarii	4½	23 9 6.52			S. 9 48		
	ι Aquarii	5½	22 58 24.87			S. 8 24		
	ψ Aquarii	4½	23 9 6.50			9 48		
30	Moon I. U.	7.7	23 22 55.32	120.56	63.41	9 7 50.6	+694.1	
	Moon I. L.	- -	23 46 44.64	117.77	62.64	6 47 11.4	711.2	
	30 Piscium	5	23 55 19.74			6 44		
	33 Piscium	5	23 58 43.06			S. 6 26		
	Dec. 1	30 Piscium	5	23 55 19.73			S. 6 44	
		33 Piscium	5	23 58 43.05			6 26	
		Moon I. U.	8.8	0 10 4.28	115.62	62.03	4 23 49.5	+721.3
		Moon I. L.	- -	0 33 1.98	114.09	61.59	1 59 5.8	724.9
		13 Ceti	5½	0 28 35.68			4 18	
		20 Ceti	5½	0 46 24.43			S. 1 51	
		13 Ceti	5½	0 28 35.68			S. 4 18	
		20 Ceti	5½	0 46 24.43			S. 1 51	
		Moon I. U.	9.8	0 55 45.20	113.20	61.31	N. 0 25 44.7	+722.5
		Moon I. L.	- -	1 18 21.16	112.89	61.19	2 49 31.1	714.3
f Piscium		6	1 11 8.30			2 56		
μ Piscium *		5	1 23 25.12			N. 5 28		
f Piscium		6	1 11 8.29			N. 2 56		
μ Piscium *		5	1 23 25.11			5 28		
2	Moon I. U.	10.8	1 40 56.79	113.14	61.23	5 11 4.6	+700.3	
	Moon I. L.	- -	2 3 38.62	113.91	61.42	7 29 15.6	680.6	
	ε Ceti	4½	2 6 9.47			8 14		
	ε Arietis *	5½	2 17 54.03			N. 10 1		
	ε Ceti	4½	2 6 9.47			N. 8 14		
	ε Arietis *	5½	2 17 54.03			10 1		
	Moon I. U.	11.8	2 26 32.66	115.17	61.74	9 42 54.0	+654.8	
	Moon I. L.	- -	2 49 44.43	116.86	62.17	11 50 46.2	622.9	
	μ Ceti	4	2 37 58.03			9 34		
	λ Ceti	5½	2 52 48.28			N. 8 23		
	μ Ceti	4	2 37 58.03			N. 9 34		
	λ Ceti	5½	2 52 48.28			8 23		
	Moon I. U.	12.9	3 13 18.79	118.92	62.71	13 51 36.7	+584.4	
	Moon I. L.	- -	3 37 19.79	121.29	63.33	15 44 5.7	+539.3	
f Tauri *	4	3 23 45.21			N. 12 29			



Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R.A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.	Declination.		
Dec. 5	$\lambda$ Tauri - *	3½	h m s 3 53 32.06	"	"	N.12 7 "	"	
6	$f$ Tauri - *	4	3 23 45.22			N.12 29		
	$\lambda$ Tauri - *	3½	3 53 32.06			12 7		
	Moon I. U.	13.9	4 1 50.52	123.86	64.00	17 26 51.4	+487.2	
	Moon I. L.	- -	4 26 52.90	126.54	64.71	18 58 29.9	428.1	
	$\delta$ Tauri - -	4	4 15 29.77			17 14		
	$\epsilon$ Tauri - -	3½	4 21 5.08			N.18 53		
7	$\delta$ Tauri - -	4	4 15 29.76			N.17 14		
	$\epsilon$ Tauri - -	3½	4 21 5.09			18 53		
	Moon I. U.	14.9	4 52 27.54	129.22	65.40	20 17 37.9	+362.1	
	$\eta$ Tauri - -	5½	5 24 39.12			18 30		
	$\zeta$ Tauri - -	3½	5 29 56.22			N.21 4		
8	$\eta$ Tauri - -	5½	5 24 39.14			N.18 30		
	$\zeta$ Tauri - -	3½	5 29 56.24			21 4		
	Moon II. L.	- -	5 20 45.65	131.85	66.06	21 22 54.8	+289.6	
	Moon II. U.	16.0	5 47 21.77	134.11	66.65	22 13 5.8	211.3	
	$\gamma$ Geminor.	3½	6 7 5.40			22 33		
	$\mu$ Geminor.	3	6 15 9.29			N.22 35		
9	$\gamma$ Geminor.	3½	6 7 5.42			N.22 33		
	$\mu$ Geminor.	3	6 15 9.31			22 35		
	Moon II. L.	- -	6 14 22.71	135.97	67.15	22 47 5.3	+127.9	
	Moon II. U.	17.0	6 41 43.22	137.36	67.53	23 4 0.6	+40.8	
	$\delta$ Geminor.	4	6 56 27.33			20 45		
	$\epsilon$ Geminor.	3½	7 12 24.87			N.22 13		
10	$\delta$ Geminor.	4	6 56 27.35			N.20 45		
	$\epsilon$ Geminor.	3½	7 12 24.89			22 13		
	Moon II. L.	- -	7 9 17.16	138.20	67.78	23 3 14.0	-48.8	
	Moon II. U.	18.0	7 36 57.91	138.49	67.89	22 44 25.7	139.3	
	$\psi$ Cancrī - -	4	8 2 40.54			25 54		
	$\lambda$ Cancrī - -	6	8 12 51.31			N.24 26		
11	$\psi$ Cancrī - -	4	8 2 40.57			N.25 54		
	$\lambda$ Cancrī - -	6	8 12 51.34			24 26		
	Moon II. L.	- -	8 4 38.96	138.26	67.87	22 7 34.7	-229.0	
	Moon II. U.	19.1	8 32 14.47	137.59	67.73	21 12 57.9	316.6	
	B.A.C. 3138	6	9 6 14.51			21 49		
	$\delta$ Cancrī - -	6	9 11 45.99			N.18 15		
12	B.A.C. 3138	6	9 6 14.55			N.21 49		
	$\delta$ Cancrī - -	6	9 11 46.02			18 15		
	Moon II. L.	- -	8 59 39.77	136.58	67.52	20 1 9.2	-400.8	
	Moon II. U.	20.1	9 26 51.65	135.38	67.24	18 32 57.7	480.3	
	$\alpha$ Leonis - *	1½	10 1 29.19			12 36		
	$\gamma$ Leonis - -	2	10 12 50.54			N.20 30		
13	$\alpha$ Leonis - *	1½	10 1 29.22			N.12 36		
	$\gamma$ Leonis - -	2	10 12 50.57			20 30		
	Moon II. L.	- -	9 53 48.58	134.12	66.95	16 49 24.8	-554.2	
	Moon II. U.	21.1	10 20 30.81	132.95	66.67	N.14 51 41.9	-621.8	



# MOON-CULMINATING STARS, 1870. 42

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					
			Apparent Right Ascension in Time.	Var. of Q's R.A. in 1 hour of Long.	Sidereal Time of Q's Sem. pas. mer.	Declination.	Var. of Q's Dec. in 1 hour of Long.	
			h m s	s	s	° ' "	"	
Dec. 13	l Leonis - *	5	10 42 27.47			N. 11 14		
	x Leonis - *	5	10 58 20.65			8 2		
14	l Leonis - *	5	10 42 27.51			N. 11 14		
	x Leonis - *	5	10 58 20.68			8 2		
	Moon II. L.	- -	10 47 0.26	132.01	66.44	12 41 8.9	-682.5	
	Moon II. U.	22.2	11 13 20.43	131.42	66.30	10 19 12.9	735.6	
	γ Virginis *	4½	11 39 12.67			7 15		
	π Virginis *	4½	11 54 14.49			N. 7 20		
15	γ Virginis *	4½	11 39 12.70			N. 7 15		
	π Virginis *	4½	11 54 14.53			7 20		
	Moon II. L.	- -	11 39 36.13	131.28	66.27	7 47 28.2	-780.5	
	Moon II. U.	23.2	12 5 53.32	131.68	66.37	N. 5 7 36.6	816.6	
	γ Virginis -	2½	12 35 5.94			S. 0 44		
	δ Virginis *	3	12 49 4.83			N. 4 6		
16	γ Virginis -	2½	12 35 5.97			S. 0 44		
	δ Virginis *	3	12 49 4.86			N. 4 6		
	Moon II. L.	- -	12 32 18.93	132.69	66.62	N. 2 21 28.9	-843.0	
	Moon II. U.	24.2	12 59 0.50	134.35	67.03	S. 0 28 52.6	858.7	
	65 Virginis -	6	13 16 36.23			S. 4 15		
	ξ Virginis -	3½	13 28 5.51			N. 0 4		
17	65 Virginis -	6	13 16 36.26			S. 4 15		
	ξ Virginis -	3½	13 28 5.54			N. 0 4		
	Moon II. L.	- -	13 26 6.01	136.68	67.60	S. 3 21 12.8	-862.6	
	Moon II. U.	25.3	13 53 43.50	139.67	68.34	6 13 0.9	853.1	
	κ Virginis -	4½	14 5 59.16			9 40		
	λ Virginis -	4½	14 12 5.99			S. 12 46		
18	κ Virginis -	4½	14 5 59.19			S. 9 40		
	λ Virginis -	4½	14 12 6.02			12 46		
	Moon II. L.	- -	14 22 0.56	143.27	69.21	9 1 29.7	-829.1	
	Moon II. U.	26.3	14 51 3.90	147.36	70.19	S. 11 43 34.6	788.9	
19	Moon II. L.	- -	15 20 58.54	151.78	71.25	S. 14 15 56.2	-731.7	
	Moon II. U.	27.4	15 51 46.88	156.27	72.31	16 35 6.1	656.9	
20	Moon II. L.	- -	16 23 27.96	160.51	73.30	S. 18 37 33.7	-564.8	
	Moon II. U.	28.4	16 55 56.63	164.13	74.14	20 19 59.8	457.0	
21	Moon II. L.	- -	17 29 3.09	166.74	74.75	S. 21 39 31.7	-336.4	
	Moon II. U.	29.4	18 2 33.24	168.03	75.05	22 33 57.7	206.9	
22	Moon I. L.	- -	18 33 39.69	167.81	75.00	S. 23 2 2.0	- 73.6	
23	Moon I. U.	1.0	19 7 4.40	166.04	74.59	S. 23 3 31.1	+ 58.0	
	Moon I. L.	- -	19 39 58.95	162.82	73.85	22 39 14.5	183.2	
24	Moon I. U.	2.1	20 12 7.51	158.44	72.83	S. 21 50 56.0	+297.8	
	Moon I. L.	- -	20 43 18.19	153.24	71.60	20 41 0.1	399.1	
25	Moon I. U.	3.1	21 13 23.60	147.62	70.26	S. 19 12 15.5	+485.8	
	Moon I. L.	- -	21 42 20.83	141.93	68.87	17 27 40.3	+557.6	
	γ Capricorni	3½	21 32 54.39			S. 17 15		



# 128 MOON-CULMINATING STARS, 1870.

Month and Day.	Name.	Mag- nitude.	At Greenwich Transit.					Declination.	Var. of C's Dec. in 1 hour of Long.
			Apparent Right Ascension in Time.	Var. of C's R. A. in 1 hour of Long.	Sidereal Time of C's Sem. pas. mer.				
Dec. 25	♑ Capricorni	3	h m s 21 39 52.97	s	s	S. 16° 43'			
26	♑ Capricorni	3½	21 32 54.38			S. 17 15			
	♑ Capricorni	3	21 39 52.96			16 43			
	Moon I. U.	4.2	22 10 10.68	136.44	67.51	15 30 9.7	+615.2		
	Moon I. L.	- -	22 36 56.91	131.35	66.23	13 22 26.8	659.8		
	♊ Aquarii -	4½	22 23 47.24			11 20			
	♊ Aquarii -	4	22 42 43.89			S. 14 17			
27	♊ Aquarii -	4½	22 23 47.23			S. 11 20			
	♊ Aquarii -	4	22 42 43.88			14 17			
	Moon I. U.	5.2	23 2 45.34	126.82	65.06	11 6 59.8	+692.8		
	Moon I. L.	- -	23 27 43.15	122.92	64.04	8 45 59.1	715.7		
	B.A.C. 8221	6	23 30 56.89			13 47			
	B.A.C. 8239	6	23 34 26.92			S. 12 24			
28	B.A.C. 8221	6	23 30 56.89			S. 13 47			
	B.A.C. 8239	6	23 34 26.91			12 24			
	Moon I. U.	6.2	23 51 58.21	119.70	63.19	6 21 18.0	+729.8		
	Moon I. L.	- -	0 15 38.76	117.17	62.52	3 54 35.2	736.2		
	12 Ceti - - -	6	0 23 26.26			4 40			
	13 Ceti - - -	5½	0 28 35.41			S. 4 18			
29	12 Ceti - - -	6	0 23 26.25			S. 4 40			
	13 Ceti - - -	5½	0 28 35.40			4 18			
	Moon I. U.	7.3	0 38 53.00	115.32	62.01	S. 1 27 17.6	+735.8		
	Moon I. L.	- -	1 1 49.09	114.14	61.68	N. 0 59 18.3	729.2		
	33 Ceti - - -	6	1 3 54.52			N. 1 45			
	38 Ceti - - -	6	1 8 13.15			S. 1 40			
30	33 Ceti - - -	6	1 3 54.50			N. 1 45			
	38 Ceti - - -	6	1 8 13.14			S. 1 40			
	Moon I. U.	8.3	1 24 34.87	113.60	61.52	N. 3 24 1.5	+717.1		
	Moon I. L.	- -	1 47 17.89	113.67	61.53	5 45 46.3	699.5		
	♈ Piscium *	4	1 38 34.43			8 30			
	♈ Piscium -	4	1 46 52.06			N. 2 33			
31	♈ Piscium *	4	1 38 34.42			N. 8 30			
	♈ Piscium -	4	1 46 52.05			2 33			
	Moon I. U.	9.3	2 10 5.27	114.32	61.69	8 3 27.3	+676.5		
	Moon I. L.	- -	2 33 3.76	115.51	61.99	10 15 59.5	+648.0		
	♉ Ceti - - *	4	2 21 17.67			7 53			
	♊ Ceti - - *	4	2 37 57.90			N. 9 34			



In the Year 1870 there will be four Eclipses of the Sun, and two of the Moon.  
**I.—A Total Eclipse of the MOON, January 17, 1870, partly visible at Greenwich.**

ELEMENTS.			
Greenwich Mean Time of $\oint$ in R.A.	Jan. 17,	<sup>h</sup> 2	<sup>m</sup> 47 <sup>s</sup> 27.2
( $\zeta$ 's Right Ascension - - - - -		7	57 42.65
( $\zeta$ 's Declination - - - - -	N.	20	35 59.1
( $\odot$ 's Declination - - - - -	S.	20	42 5.1
( $\zeta$ 's Hourly Motion in R. A. - - - - -		36	45.3
( $\odot$ 's Hourly Motion in R. A. - - - - -		2	40.1
( $\zeta$ 's Hourly Motion in Declination - - - S.		3	36.7
( $\odot$ 's Hourly Motion in Declination - - - N.			29.8
( $\zeta$ 's Equatorial Horizontal Parallax - - -		58	21.3
( $\odot$ 's Equatorial Horizontal Parallax - - -			9.1
( $\zeta$ 's True Semidiameter - - - - -		15	55.7
( $\odot$ 's True Semidiameter - - - - -		16	17.6

First contact with the Penumbra,	Jan. 16,	<sup>h</sup> 23 <sup>m</sup> 55.8	} Mean Time at Greenwich.
First contact with the Shadow - —	17,	0 57.0	
Beginning of Total Phase - - —		1 57.4	
Middle of the Eclipse - - - —		2 46.4	
End of Total Phase - - - —		3 35.4	
Last contact with the Shadow - —		4 35.8	
Last contact with the Penumbra —		5 37.0	

At these times respectively, the Moon will be in the Zenith at the places whose positions are,

Longitude <sup>°</sup> 177 <sup>'</sup> 59 W. }	Latitude <sup>°</sup> 20 <sup>'</sup> 53 N.
167 18 E. }	20 50
152 47 }	20 46
141 0 } of Greenwich.	20 43
129 13 }	20 40
114 41 }	20 37
99 58 E. }	20 33 N.

Magnitude of the Eclipse (Moon's diameter = 1) 1.653.

The first contact with the Shadow occurs at 90° from the Northernmost point of the Moon's limb towards the East.

The last contact at 79° towards the West; in each case, for *direct* image.

The Moon will rise at Greenwich slightly eclipsed and obscured by the Penumbra.



II.—A Partial Eclipse of the *SUN*, January 31, 1870, invisible at Greenwich.

ELEMENTS.			
	h	m	s
Greenwich Mean Time of $\odot$ in R.A. Jan. 31,	2	59	11.4
$\odot$ 's and $\zeta$ 's Right Ascension - - - -	20	56	14.93
$\zeta$ 's Declination - - - - - S.	18	31	55.6
$\odot$ 's Declination - - - - - S.	17	18	59.1
$\zeta$ 's Hourly Motion in R.A. - - - - -	33	5	1
$\odot$ 's Hourly Motion in R.A. - - - - -	2	33	2
$\zeta$ 's Hourly Motion in Declination - - - N.	6	3	6
$\odot$ 's Hourly Motion in Declination - - - N.	42	1	
$\zeta$ 's Equatorial Horizontal Parallax - -	56	3	1
$\odot$ 's Equatorial Horizontal Parallax - -		9	1
$\zeta$ 's True Semidiameter - - - - -	15	18	0
$\odot$ 's True Semidiameter - - - - -	16	15	9

Begins on the Earth generally, Jan. 31,  $1^h 44^m.6$ , Mean Time at Greenwich, in Longitude  $146^\circ 3' W.$  of Greenwich, and Latitude  $60^\circ 37' S.$

Greatest Eclipse, Jan. 31,  $3^h 26^m.2$ , Mag. (Sun's diam.=1)  $0.481$ , in Longitude  $100^\circ 0' E.$  of Greenwich, and Latitude  $69^\circ 58' S.$

Ends on the Earth generally, Jan. 31,  $5^h 8^m.0$ , in Longitude  $32^\circ 52' E.$  of Greenwich, and Latitude  $42^\circ 22' S.$

The limiting lines of this Eclipse, in the diagram in page 432, have been laid down from the following calculated positions :—



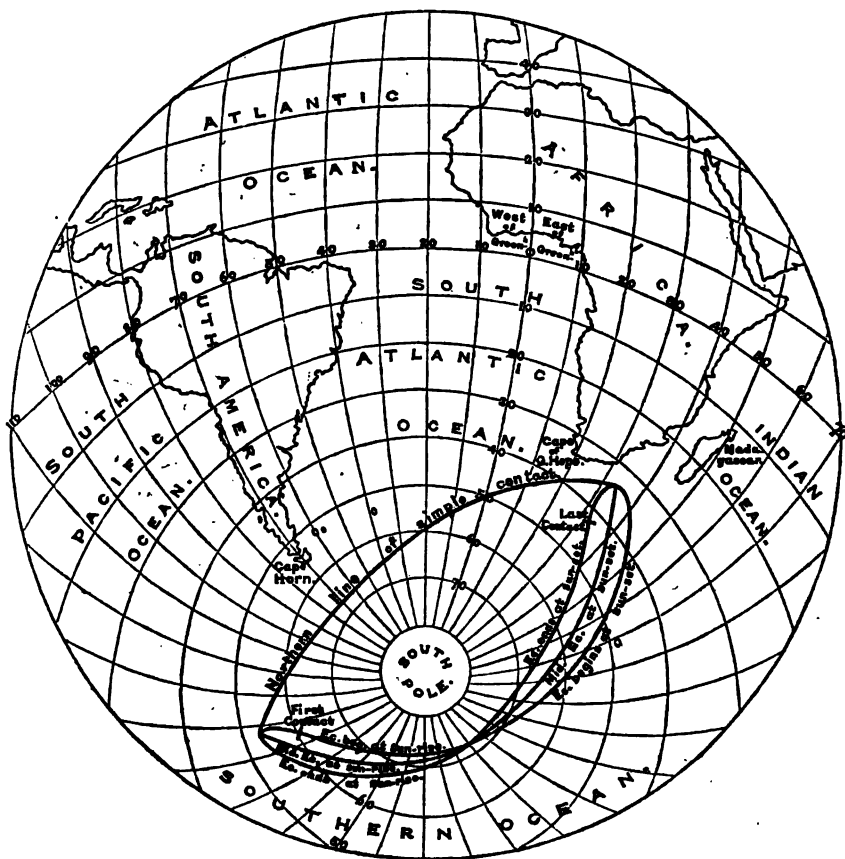
Northern line of simple contact.			
Longitude.	Latitude.	Longitude.	Latitude.
°   '   W.	°   '   S.	°   '   W.	°   '   S.
142 26 W.	52 50 S.	25 56 W.	60 51 S.
133 3	56 1	15 40	57 10
123 45	58 53	7 25 W.	53 26
113 26	61 36	0 18 E.	49 26
100 19	64 11	7 43	45 27
84 42	66 2	14 37	41 53
68 15	66 37	20 48	38 57
52 49	65 53	27 2	36 20
38 4 W.	63 50 S.	34 1 E.	33 45 S.

Eclipse begins at Sun-set.			
Longitude.	Latitude.	Longitude.	Latitude.
°   '   E.	°   '   S.	°   '   E.	°   '   S.
127 58 E.	71 46 S.	60 56 E.	48 55 S.
113 0	69 48	57 59	46 57
100 59	67 15	54 46	44 46
91 13	64 19	51 18	42 24
83 11	61 13	47 41	40 1
77 3	58 22	44 19	37 55
72 19	55 53	41 12	36 10
68 36	53 45	38 19	34 50
65 43	52 0	35 41	34 1
63 32 E.	50 37 S.	33 22 E.	33 53 S.

Eclipse ends at Sun-rise.			
Longitude.	Latitude.	Longitude.	Latitude.
°   '   E.	°   '   S.	°   '   W.	°   '   S.
146 43 E.	71 47 S.	169 56 W.	62 39 S.
156 57	70 37	164 32	60 38
164 42	69 24	159 17	58 32
170 30	68 14	154 42	56 39
174 43	67 16	150 41	55 4
179 34 E.	65 59	147 11	53 50
175 16 W.	64 27 S.	144 14 W.	53 5 S.



PATH OF THE MOON'S PENUMBRA UPON  
THE SURFACE OF THE EARTH, DURING THE PARTIAL ECLIPSE OF THE SUN,  
JANUARY 31, 1870.





## III.—A Partial Eclipse of the SUN, June 28, 1870, invisible at Greenwich.

ELEMENTS.		
Greenwich Mean Time of $\phi$ in R.A. June 28,	<sup>h</sup> <sup>m</sup> <sup>s</sup>	
$\odot$ 's and $\zeta$ 's Right Ascension - - - -	11 40 21.7	
$\zeta$ 's Declination - - - - - N.	22 9 32.4	
$\odot$ 's Declination - - - - - N.	23 16 14.3	
$\zeta$ 's Hourly Motion in R.A. - - - - -	34 14.9	
$\odot$ 's Hourly Motion in R.A. - - - - -	2 35.6	
$\zeta$ 's Hourly Motion in Declination - - - N.	1 10.7	
$\odot$ 's Hourly Motion in Declination - - - S.	7.5	
$\zeta$ 's Equatorial Horizontal Parallax - -	55 52.9	
$\odot$ 's Equatorial Horizontal Parallax - -	8.8	
$\zeta$ 's True Semidiameter - - - - -	15 15.2	
$\odot$ 's True Semidiameter - - - - -	15 46.0	

Begins on the Earth generally, June 28, 9<sup>h</sup> 53<sup>m</sup>.1, Mean Time at Greenwich,  
in Longitude 149° 58' E. of Greenwich, and Latitude 47° 13' S.

Greatest Eclipse, June 28, 11<sup>h</sup> 46<sup>m</sup>.4, Mag. (Sun's diam. = 1) 0.635,  
in Longitude 169° 26' W. of Greenwich, and Latitude 66° 44' S.

Ends on the Earth generally, June 28, 13<sup>h</sup> 39<sup>m</sup>.7,  
in Longitude 137° 39' W. of Greenwich, and Latitude 42° 59' S.

The limiting lines of this Eclipse, in the diagram in page 435, have been  
laid down from the following calculated positions :—



## Northern line of simple contact.

Longitude.	Latitude.	Longitude.	Latitude.
<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>
135 45 E.	38 18 S.	172 12 W.	16 53 S.
146 21	33 19	168 13	17 3
154 14	29 22	164 16	17 39
161 3	25 54	159 49	18 46
166 47	23 2	154 56	20 24
171 39	20 50	149 11	22 42
176 3	19 8	142 25	25 41
179 58 E.	17 58	134 39	29 13
176 4 W.	17 11 S.	124 24 W.	33 50 S.

## Eclipse begins at Sun-set.

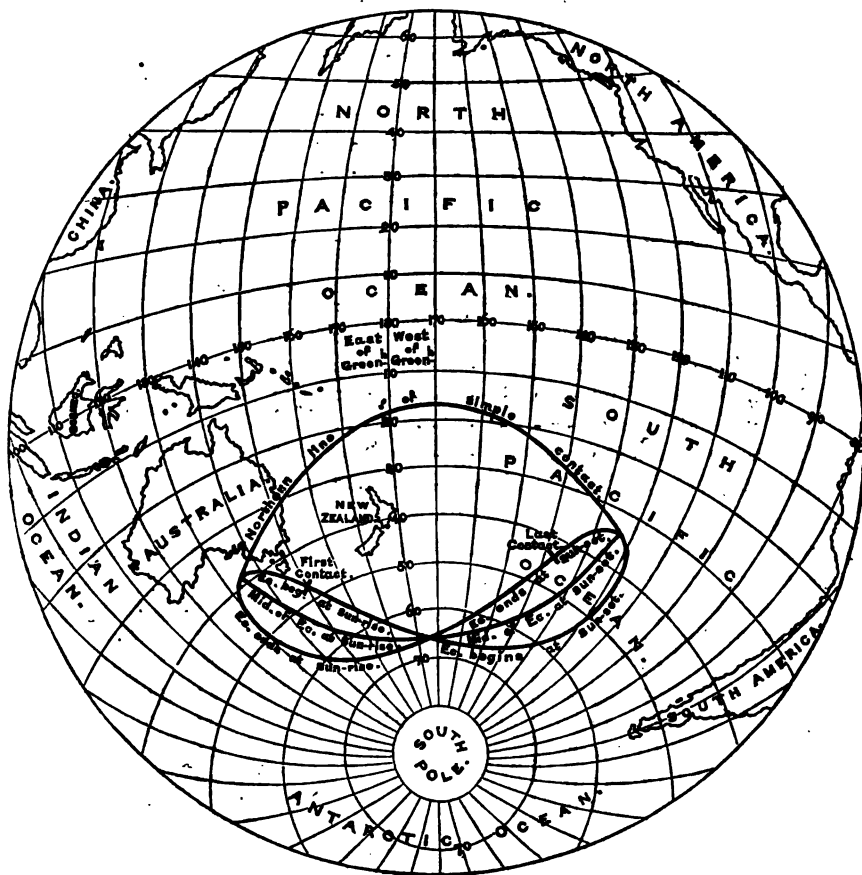
Longitude.	Latitude.	Longitude.	Latitude.
<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>
122 30 W.	34 14 S.	120 33 W.	53 27 S.
120 29	35 21	121 30	54 43
118 59	37 9	123 15	56 35
117 57	39 29	125 47	58 43
117 26	41 57	129 29	60 59
117 23	44 27	134 46	63 14
117 43	46 51	142 16	65 15
118 18	49 0	152 17	66 35
119 4	50 54	163 40	66 47
119 46 W.	52 11 S.	175 14 W.	65 40 S.

## Eclipse ends at Sun-rise.

Longitude.	Latitude.	Longitude.	Latitude.
<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>
136 28 E.	38 27 S.	133 51 E.	55 58 S.
133 53	38 41	135 0	57 7
131 58	39 47	136 22	58 16
130 37	41 32	138 47	59 58
129 50	43 49	142 13	61 47
129 37	46 13	147 4	63 40
129 54	48 38	153 43	65 21
130 38	50 56	162 34	66 32
131 39	52 59	173 24 E.	66 49
132 51 E.	54 46 S.	175 35 W.	65 53 S.



PATH OF THE MOON'S PENUMBRA UPON  
THE SURFACE OF THE EARTH, DURING THE PARTIAL ECLIPSE OF THE SUN,  
JUNE 28, 1870.





## IV.—A Total Eclipse of the MOON, July 12, 1870, visible at Greenwich.

ELEMENTS.			
Greenwich Mean Time of $\varphi$ in R.A. July 12,	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>
( $\varphi$ 's Right Ascension - - - - -	19	27	47.88
( $\varphi$ 's Declination - - - - -	S. 22	1	16.7
( $\odot$ 's Declination - - - - -	N. 21	55	17.0
( $\varphi$ 's Hourly Motion in R.A. - - - - -		37	26.9
( $\odot$ 's Hourly Motion in R.A. - - - - -		2	32.4
( $\varphi$ 's Hourly Motion in Declination - - -	N.	1	59.4
( $\odot$ 's Hourly Motion in Declination - - -	S.		21.3
( $\varphi$ 's Equatorial Horizontal Parallax - -		58	31.2
( $\odot$ 's Equatorial Horizontal Parallax - -			8.8
( $\varphi$ 's True Semidiameter - - - - -		15	58.4
( $\odot$ 's True Semidiameter - - - - -		15	46.2

First contact with the Penumbra, July 12,	<sup>h</sup>	<sup>m</sup>	} Mean Time at Greenwich.
First contact with the Shadow - —	7	46.0	
Beginning of Total Phase - - —	8	44.6	
Middle of the Eclipse - - - —	9	44.4	
End of Total Phase - - - —	10	34.2	
Last contact with the Shadow - —	11	24.0	
Last contact with the Penumbra - —	12	23.8	}
	13	22.4	

At these times respectively, the Moon will be in the Zenith at the places whose positions are,

Longitude	<sup>°</sup>	<sup>'</sup>	E.	} of Greenwich.	Latitude	<sup>°</sup>	<sup>'</sup>	S.
	63	12				22	14	
	49	8				22	13	
	34	45				22	11	
	22	48				22	9	
	10	50	E.			22	8	
	3	33	W.	}		22	5	
	17	38	W.			22	3	S.

Magnitude of the Eclipse (Moon's diameter = 1) 1.675.

The first contact with the Shadow occurs at  $81^\circ$  from the Northernmost point of the Moon's limb towards the East.

The last contact at  $87^\circ$  towards the West; in each case, for *direct* image.



## V.—A Partial Eclipse of the SUN, July 27, 1870, invisible at Greenwich.

ELEMENTS.			
Greenwich Mean Time of $\odot$ in R.A. July 27,	22	37	8 <sup>h</sup> 3 <sup>m</sup> 8 <sup>s</sup>
$\odot$ 's and $\zeta$ 's Right Ascension - - - -	8	29	47 <sup>h</sup> 52 <sup>m</sup> 52 <sup>s</sup>
$\zeta$ 's Declination - - - - - N.	20	27	34 <sup>o</sup> 0 <sup>'</sup> 0 <sup>"</sup>
$\odot$ 's Declination - - - - - N.	19	0	25 <sup>o</sup> 0 <sup>'</sup> 0 <sup>"</sup>
$\zeta$ 's Hourly Motion in R. A. - - - -	35	18	8
$\odot$ 's Hourly Motion in R. A. - - - -	2	27	2
$\zeta$ 's Hourly Motion in Declination - - S.	5	12	4
$\odot$ 's Hourly Motion in Declination - - S.		34	7
$\zeta$ 's Equatorial Horizontal Parallax - -	57	25	0
$\odot$ 's Equatorial Horizontal Parallax - -		8	8
$\zeta$ 's True Semidiameter - - - - -	15	40	3
$\odot$ 's True Semidiameter - - - - -	15	47	4

Begins on the Earth generally, July 27, 22<sup>h</sup> 22<sup>m</sup>·2, Mean Time at Greenwich,  
in Longitude 139° 4' W. of Greenwich, and Latitude 70° 30' N.

Greatest Eclipse, July 27, 23<sup>h</sup> 2<sup>m</sup>·1, Mag. (Sun's diam. = 1) 0<sup>o</sup>·078,  
in Longitude 171° 14' E. of Greenwich, and Latitude 69° 20' N.

Ends on the Earth generally, July 27, 23<sup>h</sup> 42<sup>m</sup>·1,  
in Longitude 134° 49' E. of Greenwich, and Latitude 61° 21' N.

This Eclipse is not of sufficient importance to require the usual particulars and diagram.



VI.—*A Total Eclipse of the SUN, December 21-22, 1870, visible (as a Partial one) at Greenwich.*

ELEMENTS.					
			h	m	s
Greenwich Mean Time of $\odot$ in R.A. Dec. 22,			0	18	55.1
$\odot$ 's and $\zeta$ 's Right Ascension - - - -			18	2	14.44
$\zeta$ 's Declination - - - - -	S.		22	35	6.4
$\odot$ 's Declination - - - - -	S.		23	27	15.8
$\zeta$ 's Hourly Motion in R.A. - - - - -			40	14	7
$\odot$ 's Hourly Motion in R.A. - - - - -			2	46	7
$\zeta$ 's Hourly Motion in Declination - - -	S.		3	14	6
$\odot$ 's Hourly Motion in Declination - - -	N.			0	6
$\zeta$ 's Equatorial Horizontal Parallax - -			60	38	6
$\odot$ 's Equatorial Horizontal Parallax - -				9	1
$\zeta$ 's True Semidiameter - - - - -			16	33	2
$\odot$ 's True Semidiameter - - - - -			16	17	9

Begins on the Earth generally, December 21, 22<sup>h</sup> 13<sup>m</sup> 6, Mean Time at Green<sup>h</sup>,  
in Longitude 45° 44' W. of Greenwich, and Latitude 35° 37' N.

Central Eclipse begins generally, December 21, 23<sup>h</sup> 34<sup>m</sup> 1,  
in Longitude 43° 45' W. of Greenwich, and Latitude 56° 11' N.

Central Eclipse at Noon, December 22, 0<sup>h</sup> 18<sup>m</sup> 9,  
in Longitude 5° 1' W. of Greenwich, and Latitude 36° 28' N.

Central Eclipse ends generally, December 22, 1<sup>h</sup> 20<sup>m</sup> 6,  
in Longitude 40° 55' E. of Greenwich, and Latitude 48° 3' N.

Ends on the Earth generally, December 22, 2<sup>h</sup> 41<sup>m</sup> 1,  
in Longitude 37° 16' E. of Greenwich, and Latitude 26° 5' N.

The central and limiting lines of this Eclipse, in the diagram in page 440, have been laid down from the following calculated positions:—



Line of Central Eclipse.				
Longitude.		Latitude.		
°	'	°	'	
43	45 W.	56	11 N.	0 39 E.
36	15	51	50	4 34
30	27	48	27	8 18
25	47	45	43	12 28
20	7	42	35	17 26
15	13	40	8	23 11
11	7	38	23	27 52
7	27	37	6	33 37
3	34 W.	36	8 N.	40 55 E.
				48 3 N.

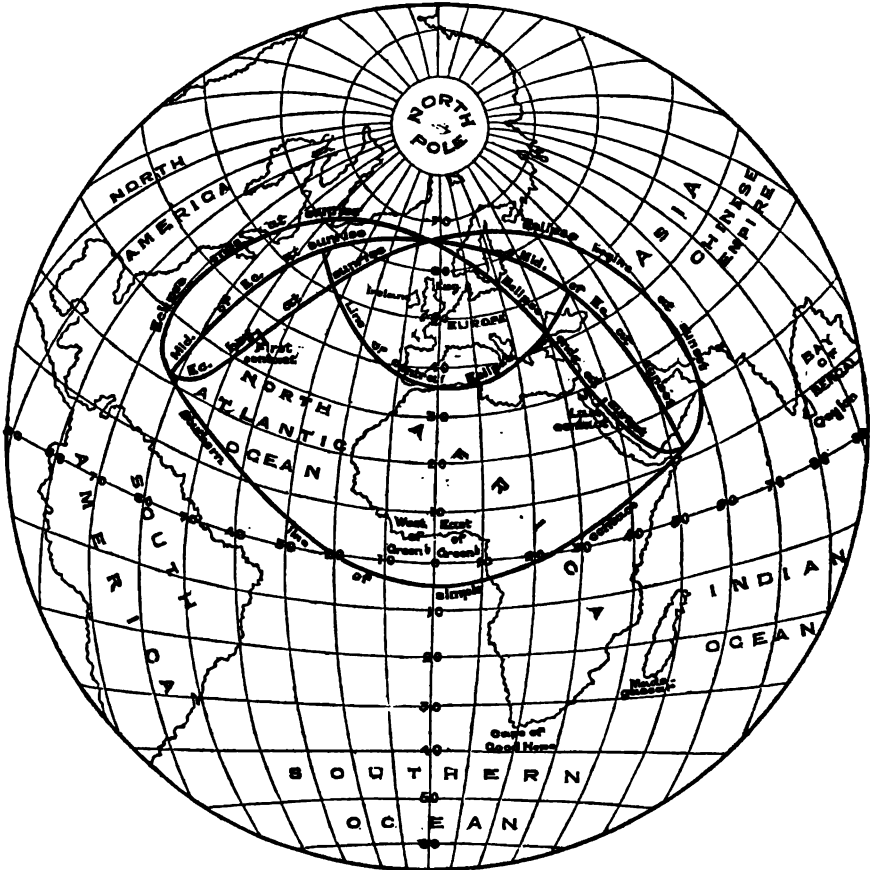
Southern line of simple contact.				
Longitude.		Latitude.		
°	'	°	'	
62	29 W.	21	45 N.	2 22 W.
52	35	17	13	3 15 E.
44	45	13	15	9 5
37	36	9	23	15 2
30	57	5	43	21 17
25	2	2	32 N.	28 12
19	25	0	13 S.	35 29
13	51	2	29	43 18
8	23 W.	4	6 S.	52 54 E.
				5 4 S.
				5 9
				4 30
				3 11
				1 15 S.
				1 21 N.
				4 23
				7 45
				11 56 N.

Eclipse begins at Sun-set.				
Longitude.		Latitude.		
°	'	°	'	
53	50 E.	12	6 N.	57 8 E.
56	22	13	8	54 55
58	23	15	20	51 32
59	46	18	37	46 32
60	37	22	55	38 27
60	47	28	8	27 51
60	10	34	4	15 17
58	55 E.	39	21 N.	2 10 E.
				44 8 N.
				48 19
				52 47
				57 15
				61 41
				64 52
				66 29
				66 27 N.

Eclipse ends at Sun-rise.				
Longitude.		Latitude.		
°	'	°	'	
16	17 W.	66	39 N.	67 24 W.
30	21	66	0	68 59
43	6	63	29	69 25
51	40	60	10	68 57
57	39	56	25	67 44
61	39	52	43	65 53
64	58 W.	48	17 N.	63 24 W.
				43 19 N.
				37 37
				32 32
				28 19
				25 7
				22 56
				21 54 N.



PATH OF THE MOON'S SHADOW AND PENUMBRA UPON  
THE SURFACE OF THE EARTH, DURING THE TOTAL ECLIPSE OF THE SUN,  
DECEMBER 21-22, 1870.





At GREENWICH a Partial Eclipse is visible, and

Begins - - - - Dec. 21,  $\begin{smallmatrix} h & m \\ 23 & 7.7 \end{smallmatrix}$  } Mean Time at Greenwich.  
 Greatest Phase — 22, 0 25.1 }  
 Ends - - - - - — 22, 1 42.1 }

Magnitude of the Eclipse (Sun's diameter = 1) 0.814.

Angle, from North Pole, of  $\left\{ \begin{array}{l} \text{first contact, } 93^\circ \text{ towards the West} \\ \text{last contact, } 106^\circ \text{ towards the East} \end{array} \right\}$  for direct  
 Angle, from Vertex, of  $\left\{ \begin{array}{l} \text{first contact, } 85^\circ \text{ towards the West} \\ \text{last contact, } 90^\circ \text{ towards the East} \end{array} \right\}$  image.

For any place not far distant from Greenwich, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formulae,

$$\cos u = 1.4718 - [0.22465] \sin l + [9.88127] \cos l \cos(\lambda + 144^\circ 0' 0'') \\ t = 1 \begin{smallmatrix} h & m & s \\ 4 & 41 & - \end{smallmatrix} - [3.66832] \sin u - [3.12178] \sin l - [3.92829] \cos l \cos(\lambda + 74^\circ 12' 3'')$$

contact on  $\odot$ 's limb,  $u - 9^\circ 36' 7''$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formulae,

$$\cos u = 1.5281 - [0.22951] \sin l + [9.85453] \cos l \cos(\lambda + 196^\circ 46' 9'') \\ t = 23 \begin{smallmatrix} h & m & s \\ 57 & 40 & + \end{smallmatrix} + [3.66225] \sin u - [2.63377] \sin l - [3.92675] \cos l \cos(\lambda + 113^\circ 42' 1'')$$

contact on  $\odot$ 's limb,  $u + 3^\circ 9' 6''$  from the North towards the East.

At CAMBRIDGE a Partial Eclipse is visible, and

Begins - - - - Dec. 21,  $\begin{smallmatrix} h & m \\ 23 & 8.6 \end{smallmatrix}$  } Mean Time at Cambridge.  
 Greatest Phase — 22, 0 25.5 }  
 Ends - - - - - — 22, 1 41.9 }

Magnitude of the Eclipse (Sun's diameter = 1) 0.808.

Angle, from North Pole, of  $\left\{ \begin{array}{l} \text{first contact, } 94^\circ \text{ towards the West} \\ \text{last contact, } 107^\circ \text{ towards the East} \end{array} \right\}$  for direct  
 Angle, from Vertex, of  $\left\{ \begin{array}{l} \text{first contact, } 86^\circ \text{ towards the West} \\ \text{last contact, } 91^\circ \text{ towards the East} \end{array} \right\}$  image.

For any place not far distant from Cambridge, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formulae,

$$\cos u = 1.4744 - [0.22470] \sin l + [9.88060] \cos l \cos(\lambda + 144^\circ 13' 1'') \\ t = 1 \begin{smallmatrix} h & m & s \\ 3 & 50 & - \end{smallmatrix} - [3.66585] \sin u - [3.11493] \sin l - [3.92586] \cos l \cos(\lambda + 74^\circ 15' 0'')$$

contact on  $\odot$ 's limb,  $u - 9^\circ 31' 0''$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formulae,

$$\cos u = 1.5288 - [0.22945] \sin l + [9.85441] \cos l \cos(\lambda + 196^\circ 50' 2'') \\ t = 23 \begin{smallmatrix} h & m & s \\ 58 & 19 & + \end{smallmatrix} + [3.65976] \sin u - [2.63486] \sin l - [3.92422] \cos l \cos(\lambda + 113^\circ 41' 5'')$$

contact on  $\odot$ 's limb,  $u + 3^\circ 11' 2''$  from the North towards the East.



At OXFORD, a Partial Eclipse is visible, and

Begins - - - - Dec. 21,  $23^{\text{h}} 0^{\text{m}} 8^{\text{s}}$   
 Greatest Phase — 22,  $0^{\text{h}} 18^{\text{m}} 0^{\text{s}}$  } Mean Time at Oxford.  
 Ends - - - - - 22,  $1^{\text{h}} 35^{\text{m}} 0^{\text{s}}$

Magnitude of the Eclipse (Sun's diameter = 1)  $0.813$ .

Angle, from North Pole, of  $\left\{ \begin{array}{l} \text{first contact, } 93^{\circ} \text{ towards the West} \\ \text{last contact, } 106^{\circ} \text{ towards the East} \end{array} \right\}$  for *direct*  
 Angle, from Vertex, of  $\left\{ \begin{array}{l} \text{first contact, } 84^{\circ} \text{ towards the West} \\ \text{last contact, } 92^{\circ} \text{ towards the East} \end{array} \right\}$  *image*.

For any place not far distant from Oxford, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formula,

$$\cos u = 1.4651 - [0.22437] \sin l + [9.88243] \cos l \cos (\lambda + 143^{\circ} 12' 8'') \\ t = 1^{\text{h}} 4^{\text{m}} 57^{\text{s}} - [3.66597] \sin u - [3.12768] \sin l - [3.92569] \cos l \cos (\lambda + 73^{\circ} 46' 4'')$$

contact on  $\odot$ 's limb,  $u = 9^{\circ} 48'$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formula,

$$\cos u = 1.5355 - [0.22642] \sin l + [9.85204] \cos l \cos (\lambda + 195^{\circ} 43' 1'') \\ t = 2^{\text{h}} 3^{\text{m}} 58^{\text{s}} + [3.66323] \sin u - [2.66795] \sin l - [3.92466] \cos l \cos (\lambda + 113^{\circ} 7' 2'')$$

contact on  $\odot$ 's limb,  $u = 3^{\circ} 26'$  from the North towards the East.

At LIVERPOOL, a Partial Eclipse is visible, and

Begins - - - - Dec. 21,  $22^{\text{h}} 52^{\text{m}} 2^{\text{s}}$   
 Greatest Phase — 22,  $0^{\text{h}} 8^{\text{m}} 0^{\text{s}}$  } Mean Time at Liverpool.  
 Ends - - - - - 22,  $1^{\text{h}} 24^{\text{m}} 0^{\text{s}}$

Magnitude of the Eclipse (Sun's diameter = 1)  $0.804$ .

Angle, from North Pole, of  $\left\{ \begin{array}{l} \text{first contact, } 93^{\circ} \text{ towards the West} \\ \text{last contact, } 107^{\circ} \text{ towards the East} \end{array} \right\}$  for *direct*  
 Angle, from Vertex, of  $\left\{ \begin{array}{l} \text{first contact, } 84^{\circ} \text{ towards the West} \\ \text{last contact, } 95^{\circ} \text{ towards the East} \end{array} \right\}$  *image*.

For any place not far distant from Liverpool, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formula,

$$\cos u = 1.4612 - [0.22412] \sin l + [9.88272] \cos l \cos (\lambda + 142^{\circ} 33' 9'') \\ t = 1^{\text{h}} 3^{\text{m}} 43^{\text{s}} - [3.65845] \sin u - [3.12314] \sin l - [3.91792] \cos l \cos (\lambda + 73^{\circ} 15' 9'')$$

contact on  $\odot$ 's limb,  $u = 9^{\circ} 52'$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formula,

$$\cos u = 1.5480 - [0.22908] \sin l + [9.85616] \cos l \cos (\lambda + 193^{\circ} 32' 0'') \\ t = 0^{\text{h}} 1^{\text{m}} 38^{\text{s}} + [3.66027] \sin u - [2.72415] \sin l - [3.92440] \cos l \cos (\lambda + 111^{\circ} 58' 5'')$$

contact on  $\odot$ 's limb,  $u = 3^{\circ} 54'$  from the North towards the East.



At EDINBURGH, a Partial Eclipse is visible, and

Begins - - - Dec. 21, 22<sup>h</sup> 52<sup>m</sup> 8<sup>s</sup>  
 Greatest Phase — 22, 0 6<sup>m</sup> 7<sup>s</sup> } Mean Time at Edinburgh.  
 Ends - - - - - 22, 1 20<sup>m</sup> 8<sup>s</sup>

Magnitude of the Eclipse (Sun's diameter=1) 0<sup>o</sup> 788.

Angle, from North Pole, of { first contact, 95° towards the West  
 last contact, 108° towards the East } for direct  
 Angle, from Vertex, of { first contact, 86° towards the West } image.  
 last contact, 97° towards the East }

For any place not far distant from Edinburgh, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formulæ,

$$\cos u = 1.4721 - [0.22433] \sin l + [9.88037] \cos l \cos (\lambda + 143^{\circ} 34' 0'') \\ t = 1^{\text{h}} 0^{\text{m}} 30^{\text{s}} - [3.64994] \sin u - [3.09951] \sin l - [3.90957] \cos l \cos (\lambda + 73^{\circ} 38' 2'')$$

contact on  $\odot$ 's limb,  $u - 9^{\circ} 32' 1''$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formulæ,

$$\cos u = 1.5543 - [0.22877] \sin l + [9.85665] \cos l \cos (\lambda + 192^{\circ} 11' 4'') \\ t = 0^{\text{h}} 4^{\text{m}} 44^{\text{s}} + [3.65220] \sin u - [2.73994] \sin l - [3.91602] \cos l \cos (\lambda + 111^{\circ} 10' 2'')$$

contact on  $\odot$ 's limb,  $u + 4^{\circ} 8' 0''$  from the North towards the East.

At DUBLIN, a Partial Eclipse is visible, and

Begins - - - Dec. 21, 22<sup>h</sup> 34<sup>m</sup> 1<sup>s</sup>  
 Greatest Phase — 21, 23 49<sup>m</sup> 6<sup>s</sup> } Mean Time at Dublin.  
 Ends - - - - - 22, 1 5<sup>m</sup> 9<sup>s</sup>

Magnitude of the Eclipse (Sun's diameter=1) 0<sup>o</sup> 812.

Angle, from North Pole, of { first contact, 92° towards the West  
 last contact, 108° towards the East } for direct  
 Angle, from Vertex, of { first contact, 80° towards the West } image.  
 last contact, 98° towards the East }

For any place not far distant from Dublin, whose Geocentric North latitude is  $l$  and East longitude  $\lambda$ , the Mean Greenwich time  $t$  of beginning may be computed by the formulæ,

$$\cos u = 1.4417 - [0.22341] \sin l + [9.88599] \cos l \cos (\lambda + 140^{\circ} 27' 9'') \\ t = 1^{\text{h}} 4^{\text{m}} 48^{\text{s}} - [3.65424] \sin u - [3.14042] \sin l - [3.91308] \cos l \cos (\lambda + 72^{\circ} 6' 5'')$$

contact on  $\odot$ 's limb,  $u - 10^{\circ} 22' 7''$  from the North towards the West.

Also the Mean Greenwich time  $t$  of ending by the formulæ,

$$\cos u = 1.5640 - [0.22878] \sin l + [9.85839] \cos l \cos (\lambda + 190^{\circ} 16' 7'') \\ t = 0^{\text{h}} 4^{\text{m}} 24^{\text{s}} + [3.66398] \sin u - [2.80042] \sin l - [3.92784] \cos l \cos (\lambda + 110^{\circ} 15' 8'')$$

contact on  $\odot$ 's limb,  $u + 4^{\circ} 37' 3''$  from the North towards the East.



# 444 ELEMENTS OF OCCULTATIONS, 1870.

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent O in R.A. of ( and #.		At Greenwich Mean Time of O			Limiting Parallels.
					Apparent R.A. of ( and #.	Apparent Declination of #.	Diff. of Apparent Dec. of ( and #.	
			h m s	h m s	° ' "	° ' "	Latitude.	
Jan. 3	θ Capricor.	4	19 32 33	20 58 36.03	S. 17 44 54.9	S. 40 51	14 S. 90 S.	
4	ι Capricor.	4½	3 0 18	21 14 58.16	17 23 16.5	S. 13 54	14 N. 52 S.	
4	γ Capricor.	3½	11 18 22	21 32 51.10	17 14 59.7	N. 37 15	71 N. 0	
4	δ Capricor.	3	14 35 17	21 39 49.69	16 43 3.4	N. 30 14	62 N. 7 S.	
4	♑ Aquarii -	4	23 55 15	21 59 22.83	S. 14 30 5.0	S. 27 48	3 N. 70 S.	
6	ψ Aquarii -	4½	10 47 20	23 9 3.06	S. 9 47 53.6	N. 12 4	47 N. 25 S.	
6	ψ Aquarii -	4½	11 51 42	23 11 7.27	9 53 41.2	N. 28 35	67 N. 9 S.	
6	ψ Aquarii -	5	12 24 24	23 12 10.29	S. 10 19 25.1	N. 59 46	80 N. 27 N.	
9	ν Piscium -	4½	17 5 28	1 34 39.34	N. 4 49 35.7	S. 35 59	1 N. 82 S.	
10	ξ Ceti - -	4½	9 59 55	2 6 6.13	N. 8 14 1.3	S. 63 30	34 S. 82 S.	
10	ξ Ceti - -	4	18 1 46	2 21 14.52	N. 7 52 25.5	N. 39 53	90 N. 5 N.	
11	μ Ceti - -	4	2 46 9	2 37 54.71	9 33 42.0	N. 25 27	67 N. 9 S.	
12	♉ Tauri - -	4	2 7 5	3 23 41.92	12 29 14.7	N. 67 23	90 N. 46 N.	
13	δ Tauri - -	4	3 12 48	4 15 26.48	17 14 2.2	S. 16 11	21 N. 44 S.	
13	δ Tauri - -	5	4 24 21	4 17 58.46	N. 17 37 39.9	S. 31 18	6 N. 62 S.	
14	ζ Tauri - -	3½	12 59 12	5 29 53.20	N. 21 33 3.8	S. 52 0	17 S. 69 S.	
14	α Orionis -	4½	20 17 8	5 46 41.48	20 14 52.8	N. 23 52	65 N. 2 N.	
15	α Orionis -	5	0 22 30	5 56 12.50	20 8 13.9	N. 43 8	90 N. 22 N.	
15	15 Geminor.	6	10 29 29	6 20 2.21	20 51 55.5	N. 22 17	63 N. 4 N.	
15	16 Geminor.	6	10 34 10	6 20 13.33	N. 20 34 9.9	N. 40 10	90 N. 21 N.	
15	ν Geminor.	4½	11 0 11	6 21 15.15	N. 20 17 25.0	N. 57 37	90 N. 41 N.	
16	ζ Geminor.	4	1 39 30	6 56 24.44	20 45 25.2	N. 39 19	90 N. 22 N.	
16	δ Geminor.	3½	8 14 13	7 12 22.01	22 13 3.3	S. 52 58	18 S. 68 S.	
16	56 Geminor.	5½	9 1 34	7 14 17.22	20 41 8.2	N. 38 0	89 N. 19 N.	
17	δ Cancrī - -	4	18 57 55	8 37 18.24	N. 18 37 43.0	N. 42 45	90 N. 16 N.	
19	ι Leonis - -	5	23 21 1	10 42 25.51	N. 11 13 53.2	N. 34 38	77 N. 2 S.	
21	ν Virginis -	4½	0 9 6	11 39 10.86	7 15 25.0	S. 20 19	19 N. 56 S.	
21	c Virginis -	5	15 33 19	12 13 44.77	N. 4 2 10.8	S. 22 46	17 N. 60 S.	
25	γ Libræ - -	4½	6 43 23	15 28 14.30	S. 14 21 8.0	N. 24 50	56 N. 14 S.	
25	θ Libræ - -	4½	14 38 2	15 46 24.49	S. 16 20 37.8	N. 69 22	74 N. 38 N.	
25	49 Libræ - -	5½	17 29 35	15 53 0.61	S. 16 8 46.8	N. 31 49	63 N. 7 S.	
26	φ Ophiuchi	5	6 40 27	16 23 40.83	16 19 30.4	S. 65 35	41 S. 90 S.	
26	B.A.C. 5579	5	11 5 16	16 34 1.94	17 29 10.3	S. 28 6	0 69 S.	
28	μ Sagittarii	4	1 45 6	18 5 57.34	21 5 21.2	N. 3 5	22 N. 34 S.	
28	15 Sagittarii	5	2 21 58	18 7 25.53	S. 20 45 49.2	S. 17 54	2 N. 57 S.	
28	21 Sagittarii	5	6 36 39	18 17 34.49	S. 20 36 27.9	S. 35 59	16 S. 85 S.	
28	ξ Sagittarii	4	20 10 49	18 49 56.26	21 16 27.7	S. 8 32	7 N. 46 S.	
28	ο Sagittarii	4	23 5 35	18 56 51.36	21 55 42.7	N. 31 3	50 N. 6 S.	
29	π Sagittarii	3	1 15 39	19 1 59.77	21 13 37.2	S. 10 6	6 N. 48 S.	
Feb. 2	ψ Aquarii -	4½	19 11 1	23 9 2.89	S. 9 47 54.3	N. 12 51	48 N. 25 S.	
2	ψ Aquarii -	4½	20 14 58	23 11 7.09	S. 9 53 41.9	N. 29 22	68 N. 8 S.	
2	ψ Aquarii -	5	20 47 28	23 12 10.11	S. 10 19 25.8	N. 60 34	80 N. 29 N.	
6	ν Piscium -	4½	1 11 56	1 34 38.97	N. 4 49 34.0	S. 34 6	3 N. 79 S.	
6	ξ Ceti - -	4½	18 11 1	2 6 5.76	8 13 59.7	S. 61 24	30 S. 82 S.	
7	ξ Ceti - -	4	2 16 28	2 21 14.14	N. 7 52 23.9	N. 42 4	90 N. 7 N.	



# ELEMENTS OF OCCULTATIONS, 1870. 445

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent C in R. A. of C and #.	At Greenwich Mean Time of C			Limiting Parallels.
				Apparent R. A. of C and #.	Apparent Declination of #.	Diff. of Apparent Dec. of C and #.	
			h m s	h m s	° ' "	° ' "	Latitude.
Feb. 7	μ Ceti - -	4	11 54 9	2 37 54.34	N. 9 33 40.6	N. 27 42	70° N. 7 S.
8	f Tauri - -	4	10 44 40	3 23 41.55	12 29 13.6	N. 69 47	90° N. 53 N.
9	δ Tauri - -	4	12 15 11	4 15 26.15	17 14 1.8	S. 13 46	23° N. 42 S.
9	63 Tauri - -	6	12 30 12	4 15 57.45	16 28 15.7	N. 33 46	81° N. 5 N.
9	δ Tauri - -	5	13 28 0	4 17 58.13	N. 17 37 39.5	S. 28 54	8° N. 59 S.
10	m Tauri - -	5½	9 14 9	4 59 46.21	N. 18 27 59.8	N. 41 46	90° N. 17 N.
10	ζ Tauri - -	3½	22 36 45	5 29 53.11	21 3 34.0	S. 49 49	15° S. 69 S.
11	χ' Orionis -	4½	6 12 1	5 46 41.27	20 14 53.0	N. 25 56	68° N. 5 N.
11	χ' Orionis -	6	6 16 16	5 47 15.34	19 43 13.7	N. 58 23	90° N. 40 N.
11	χ' Orionis -	6	9 58 51	5 55 46.03	N. 19 41 18.5	N. 71 32	90° N. 65 N.
11	χ' Orionis -	5	10 10 16	5 56 12.32	N. 20 8 14.2	N. 45 9	90° N. 25 N.
11	ν Geminor. -	4½	20 56 6	6 21 15.03	20 17 25.3	N. 59 26	90° N. 44 N.
12	ζ Geminor. -	4	11 43 42	6 56 24.39	20 45 25.7	N. 40 49	90° N. 24 N.
12	δ Geminor. -	3½	18 20 50	7 12 22.00	22 13 3.9	S. 51 39	16° S. 68 S.
14	δ Cancri -	4	5 1 16	8 37 18.45	N. 18 37 42.9	N. 42 56	90° N. 16 N.
15	34 Leonis -	6	16 43 6	10 4 39.27	N. 13 59 37.3	N. 35 40	79° N. 1 N.
16	l Leonis -	5	8 26 28	10 42 26.01	11 13 50.9	N. 32 29	73° N. 4 S.
17	ν Virginis -	4½	8 30 12	11 39 11.46	7 15 21.9	S. 23 41	16° N. 59 S.
17	B.A.C. 3996	6	9 54 23	11 42 27.78	5 54 54.0	N. 38 37	82° N. 1 S.
17	δ Virginis -	6	14 33 58	11 53 18.08	N. 4 22 39.7	N. 69 58	90° N. 33 N.
17	c Virginis -	5	23 24 21	12 13 45.43	N. 4 2 7.1	S. 26 51	13° N. 64 S.
21	γ Libræ - -	4½	12 18 54	15 28 15.16	S. 14 21 11.8	N. 18 38	49° N. 20 S.
21	η Libræ - -	6	15 58 57	15 36 45.64	15 15 21.0	N. 36 55	70° N. 3 S.
21	θ Libræ - -	4½	20 8 18	15 46 25.36	16 20 41.3	N. 63 10	74° N. 27 N.
22	φ Ophiuchi -	5	12 4 43	16 23 41.68	S. 16 19 33.3	S. 71 38	52° S. 90 S.
22	B.A.C. 5579	5	16 28 57	16 34 2.79	S. 17 29 13.1	S. 34 5	5° S. 79 S.
23	ε Ophiuchi -	5	9 4 11	17 13 12.07	20 58 10.5	N. 73 58	69° N. 59 N.
23	58 Ophiuchi -	5	18 32 21	17 35 37.50	21 36 55.1	N. 69 54	68° N. 46 N.
24	μ Sagittarii -	4	7 21 15	18 5 58.11	21 5 22.0	S. 1 56	17° N. 39 S.
24	15 Sagittarii -	5	7 58 32	18 7 26.30	S. 20 45 50.1	S. 22 54	3° S. 63 S.
24	21 Sagittarii -	5	12 16 13	18 17 35.24	S. 20 36 28.6	S. 40 50	22° S. 90 S.
25	ε Sagittarii -	4	2 1 27	18 49 56.98	21 16 27.8	S. 12 51	3° N. 51 S.
25	o Sagittarii -	4	4 58 50	18 56 52.06	21 55 42.6	N. 26 52	44° N. 10 S.
25	π Sagittarii -	3	7 10 53	19 2 0.44	21 13 37.1	S. 14 12	2° N. 53 S.
25	f Sagittarii -	5	23 3 23	19 38 45.09	S. 20 4 15.4	S. 58 57	42° S. 90 S.
27	MERCURY -	-	10 43 3	20 58 26.42	S. 17 18 49.6	S. 68 24	53° S. 90 S.
27	θ Capricor. -	4	10 47 42	20 58 36.53	17 44 53.6	S. 41 52	16° S. 90 S.
27	i Capricor. -	4½	18 23 41	21 14 58.57	17 23 15.1	S. 14 25	13° N. 53 S.
28	γ Capricor. -	3½	2 49 18	21 32 51.43	17 14 58.1	N. 37 17	71° N. 0
28	δ Capricor. -	3	6 8 45	21 39 49.97	S. 16 43 2.0	N. 30 31	63° N. 7 S.
28	ι Aquarii -	4	15 34 30	21 59 23.01	S. 14 30 4.1	S. 26 49	4° N. 69 S.
Mar. 5	ν Piscium -	4½	8 34 42	1 34 38.67	N. 4 49 33.0	S. 25 49	12° N. 67 S.
6	ε Ceti - -	4½	1 34 39	2 6 5.39	8 13 58.5	S. 52 17	17° S. 82 S.
6	ε Ceti - -	4	9 41 24	2 21 13.76	7 52 22.9	N. 51 32	90° N. 19 N.
6	μ Ceti - -	4	18 32 55	2 37 53.94	N. 9 33 39.4	N. 37 31	89° N. 3 N.



Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ♂ in R. A. of ♄ and ♀.	At Greenwich Mean Time of ♄			Limiting Parallels.
			♄	♄	♄		
			h m s	h m s	° ' "	° ' "	Latitude.
Mar. 8	♂ Tauri - -	4	20 13 29	4 15 25.68	N. 17 14 1.1	S. 3 2	34 N. 31 S.
	♂ Tauri - -	5	21 27 31	4 17 57.65	17 37 38.8	S. 18 9	19 N. 47 S.
	♂ Tauri - -	3½	7 16 35	5 29 52.70	21 3 34.2	S. 39 26	3 S. 68 S.
	♂ Orionis -	4½	14 51 42	5 46 40.82	20 14 53.3	N. 36 9	87 N. 15 N.
	♂ Orionis -	5	19 6 39	5 56 11.89	N. 20 8 14.5	N. 55 15	90 N. 37 N.
	♂ Geminor.	4½	6 8 32	6 21 14.60	N. 20 17 25.9	N. 69 10	90 N. 61 N.
	♂ Geminor.	4	21 18 23	6 56 24.02	20 45 26.5	N. 49 54	90 N. 34 N.
	♂ Geminor.	3½	4 5 17	7 12 21.67	22 13 5.0	S. 42 55	6 S. 68 S.
	♂ Cancri -	4	15 29 47	8 37 18.28	18 37 43.9	N. 49 16	90 N. 23 N.
	♂ Leonis -	5	19 16 25	10 42 26.16	N. 11 13 50.8	N. 33 24	74 N. 4 S.
	♂ Virginis-	4½	19 5 45	11 39 11.73	N. 7 15 21.0	S. 25 50	15 N. 62 S.
	♂ Virginis -	5	9 43 10	12 13 45.80	N. 4 2 5.6	S. 30 54	10 N. 69 S.
	♂ Libræ - -	4½	19 53 54	15 28 15.91	S. 14 21 14.7	N. 6 39	37 N. 31 S.
	♂ Libræ - -	4½	3 27 10	15 46 26.16	16 20 44.1	N. 50 52	74 N. 11 N.
	♂ Ophiuchi	6	17 8 24	16 19 29.84	S. 18 9 30.2	N. 39 15	69 N. 0
	B.A.C. 5579	5	23 9 5	16 34 3.61	S. 17 29 15.1	S. 46 55	17 S. 90 S.
	♂ Ophiuchi	5	15 17 37	17 13 12.92	20 58 11.9	N. 61 2	69 N. 27 N.
	♂ Ophiuchi	5	0 32 56	17 35 38.38	21 36 56.1	N. 57 2	68 N. 22 N.
	SATURN -	-	7 42 48	17 52 57.00	22 11 14.9	N. 65 58	68 N. 36 N.
	♂ Sagittarii	4	13 7 29	18 5 58.95	S. 21 5 22.3	S. 14 36	5 N. 53 S.
	♂ Sagittarii	5	13 44 10	18 7 27.14	S. 20 45 50.4	S. 35 33	15 S. 84 S.
	♂ Sagittarii	5	17 57 55	18 17 36.08	20 36 28.7	S. 53 22	35 S. 90 S.
	♂ Sagittarii	5	6 24 32	18 47 15.08	22 49 46.0	N. 68 25	67 N. 44 N.
♂ Sagittarii	4	7 33 17	18 49 57.79	21 16 27.3	S. 24 58	9 S. 66 S.	
♂ Sagittarii	4	10 29 5	18 56 52.87	S. 21 55 41.9	N. 14 52	30 N. 23 S.	
♂ Sagittarii	3	12 40 5	19 2 1.24	S. 21 13 36.4	S. 26 6	9 S. 68 S.	
B.A.C. 6607	6	17 16 45	19 12 49.70	22 38 33.6	N. 63 10	67 N. 34 N.	
♂ Sagittarii	5	4 28 0	19 38 45.86	20 4 14.1	S. 70 7	62 S. 90 S.	
♂ Capricor.	4	16 18 12	20 58 37.12	17 44 51.4	S. 50 40	25 S. 90 S.	
♂ Capricor.	4½	23 57 35	21 14 59.14	S. 17 23 12.6	S. 22 36	5 N. 64 S.	
♂ Capricor.	3½	8 27 31	21 32 51.94	S. 17 14 55.5	N. 29 50	61 N. 8 S.	
♂ Capricor.	3	11 48 48	21 39 50.46	16 42 59.4	N. 23 22	54 N. 14 S.	
♂ Aquarii -	4	21 20 2	21 59 23.44	14 30 1.7	S. 33 3	2 S. 80 S.	
♂ Aquarii -	4½	8 38 43	23 9 3.15	9 47 51.5	N. 13 25	49 N. 24 S.	
♂ Aquarii -	4½	9 43 31	23 11 7.35	S. 9 53 39.0	N. 30 8	70 N. 8 S.	
♂ Aquarii -	5	10 16 26	23 12 10.36	S. 10 19 22.8	N. 61 26	80 N. 30 N.	
Apr. 2	♂ Ceti - - -	4½	8 3 32	2 6 5.20	N. 8 13 58.3	S. 43 43	7 S. 82 S.
	♂ Ceti - - -	4	16 10 8	2 21 13.54	7 52 22.7	N. 60 54	90 N. 32 N.
	♂ Ceti - - -	4	1 1 30	2 37 53.68	9 33 39.1	N. 47 42	90 N. 15 N.
	♂ Tauri - - -	4	2 49 9	4 15 25.25	N. 17 14 0.4	N. 10 44	49 N. 17 S.
	♂ Tauri - - -	5	4 3 39	4 17 57.21	N. 17 37 38.2	S. 4 20	33 N. 32 S.
	♂ Tauri - - -	3½	5 33 19	4 21 0.53	18 53 16.3	S. 69 49	54 S. 71 S.
	♂ Tauri - - -	3½	14 14 41	5 29 52.20	21 3 34.0	S. 24 23	13 N. 48 S.
	♂ Orionis -	4½	21 57 16	5 46 40.33	20 14 53.3	N. 51 19	90 N. 32 N.
♂ Geminor.	3½	7 10 9	6 7 1.19	N. 22 32 27.0	S. 61 59	34 S. 67 S.	



# ELEMENTS OF OCCULTATIONS, 1870. 447

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ♂ in R. A. of ( and ♄.	At Greenwich Mean Time of ♄			Limiting Parallels.
			Apparent R. A. of ( and ♄.	Apparent Declination of ♄.	Diff. of Apparent Dec. of ( and ♄.		
			h m s	h m s	° ' "	° ' "	Latitude.
Apr.	7 μ Geminor.	3	10 47 17	6 15 5 14	N.22 34 35.4	S.57 5	26 S. 67 S.
	8 ζ Geminor.	4	5 3 25	6 56 23.51	20 45 27.3	N.65 6	90 N. 55 N.
	8 δ Geminor.	3½	12 1 0	7 12 21.17	22 13 5.9	S.27 50	10 N. 47 S.
	8 56 Geminor.	5½	12 51 3	7 14 16.38	20 41 10.6	N.63 4	90 N. 50 N.
	8 URANUS -	-	14 38 6	7 18 23.08	N.22 42 44.1	S.60 57	31 S. 67 S.
	10 δ Cancr. - -	4	0 28 37	8 37 17.87	N.18 37 45.5	N.62 57	90 N. 41 N.
	11 34 Leonis - -	6	13 37 53	10 4 39.08	13 59 39.3	N.49 2	90 N. 15 N.
	12 ι Leonis - -	5	5 44 36	10 42 26.01	11 13 52.1	N.42 3	90 N. 5 N.
	13 ν Virginis -	4½	6 0 31	11 39 11.73	7 15 21.9	S.20 44	19 N. 56 S.
	13 δ Virginis -	6	12 2 33	11 53 18.42	N. 4 22 38.7	N.71 11	90 N. 33 N.
	13 ε Virginis -	5	20 46 51	12 13 45.88	N. 4 2 5.9	S.28 15	13 N. 66 S.
	17 γ Libræ - -	4½	5 51 29	15 28 16.50	S.14 21 16.3	S. 3 48	28 N. 41 S.
	17 θ Libræ - -	4½	13 10 33	15 46 26.78	16 20 45.7	N.39 33	71 N. 2 S.
	18 B.A.C. 5579	5	8 12 16	16 34 4.35	17 29 16.2	S.60 6	31 S. 90 S.
	18 ξ Ophiuchi	5	23 46 5	17 13 13.70	S.20 58 12.6	N.46 43	69 N. 7 N.
	19 58 Ophiuchi	5	8 41 31	17 35 39.19	S.21 36 56.4	N.42 12	68 N. 3 N.
	19 SATURN -	-	15 40 17	17 53 7.94	22 9 49.3	N.49 11	68 N. 11 N.
	19 μ¹ Sagittarii	4	20 49 43	18 5 59.78	21 5 22.1	S.29 56	9 S. 73 S.
19 15 Sagittarii	5	21 25 9	18 7 27.97	20 45 50.1	S.50 54	30 S. 90 S.	
20 21 Sagittarii	5	1 30 21	18 17 36.91	S.20 36 28.3	S.68 52	55 S. 90 S.	
20 ν¹ Sagittarii	5	13 9 58	18 46 19.54	S.22 54 2.7	N.57 1	67 N. 22 N.	
20 ν² Sagittarii	5	13 33 2	18 47 15.93	22 49 45.0	N.52 39	67 N. 16 N.	
20 ξ¹ Sagittarii	4	14 39 41	18 49 58.64	21 16 26.2	S.40 44	24 S. 90 S.	
20 ο Sagittarii	4	17 30 12	18 56 53.73	21 55 40.7	S. 0 57	14 N. 39 S.	
20 π Sagittarii	3	19 37 21	19 2 2.09	S.21 13 35.0	S.41 56	24 S. 90 S.	
22 θ Capricor.	4	22 9 46	20 58 37.88	S.17 44 48.1	S.65 39	46 S. 90 S.	
23 ι Capricor.	4½	5 43 54	21 14 59.88	17 23 9.1	S.37 14	9 S. 89 S.	
23 γ Capricor.	3½	14 9 20	21 32 52.65	17 14 51.8	N.15 40	45 N. 22 S.	
23 δ Capricor.	3	17 29 12	21 39 51.16	16 42 55.6	N. 9 24	38 N. 28 S.	
24 ι Aquarii -	4	2 57 30	21 59 24.13	S.14 29 57.8	S.46 24	16 S. 90 S.	
25 ψ¹ Aquarii -	4½	14 16 30	23 9 3.67	S. 9 47 47.7	N. 3 7	38 N. 35 S.	
25 ψ² Aquarii -	4½	15 21 32	23 11 7.86	9 53 35.2	N.19 57	57 N. 18 S.	
25 ψ³ Aquarii -	5	15 54 33	23 12 10.87	S.10 19 18.9	N.51 18	80 N. 15 N.	
May	2 δ¹ Tauri - -	4	8 40 41	4 15 25.07	N.17 14 0.3	N.20 7	61 N. 8 S.
	2 δ² Tauri - -	5	9 54 57	4 17 57.03	N.17 37 38.0	N. 5 11	43 N. 23 S.
	2 ε¹ Tauri - -	3½	11 24 21	4 21 0.34	N.18 53 16.0	S.60 10	31 S. 71 S.
	3 ζ Tauri - -	3½	20 2 52	5 29 51.80	21 3 33.8	S.12 0	26 N. 34 S.
	4 χ¹ Orionis -	4½	3 46 14	5 46 39.98	20 14 53.3	N.64 15	90 N. 51 N.
	4 η Geminor.	3½	13 1 3	6 7 0.82	22 32 26.9	S.48 28	14 S. 67 S.
	4 μ Geminor.	3	16 39 16	6 15 4.77	N.22 34 35.4	S.43 22	8 S. 67 S.
	5 δ Geminor.	3½	18 6 44	7 12 20.75	N.22 13 6.4	S.12 55	25 N. 30 S.
	5 URANUS -	-	21 59 36	7 21 10.38	22 36 59.1	S.42 4	6 S. 67 S.
	9 ι Leonis - -	5	14 10 54	10 42 25.72	11 13 54.0	N.55 49	90 N. 20 N.
	10 ν Virginis -	4½	15 17 26	11 39 11.53	7 15 23.7	S. 9 16	30 N. 45 S.
	11 ε Virginis -	5	6 32 28	12 13 45.76	N. 4 2 7.5	S.18 39	21 N. 56 S.



# 48 ELEMENTS OF OCCULTATIONS, 1870.

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ☉ in R. A. of ☿ and ♄.		At Greenwich Mean Time of ☉			Limiting Parallels.
			Apparent R. A. of ☿ and ♄.		Apparent Declination of ♄.		Diff. of Apparent Dec. of ☿ and ♄.	
			h m s	h m s	° ' "	° ' "	☿ ' "	Latitude. °
May 14	♈ Libræ - -	6.	11 44 35	15 15 48.36	S. 14 40 7.5	N. 68 13		75 N. 29 N.
14	♈ Libræ - -	4½	16 46 6	15 28 16.87	14 21 16.7	S. 7 15		25 N. 45 S.
15	♈ Libræ - -	4½	0 152	15 46 27.21	16 20 46.3	N. 35 1		65 N. 6 S.
15	B.A.C. 5579	5	18 47 51	16 34 4.89	17 29 16.5	S. 67 16		40 S. 90 S.
16	♎ Ophiuchi	5	10 2 8	17 13 14.36	S. 20 58 12.8	N. 37 43		63 N. 2 S.
16	B.A.C. 5866	6	11 28 23	17 16 56.66	S. 21 19 2.1	N. 50 27		69 N. 11 N.
16	♎ Ophiuchi	5	18 44 8	17 35 39.88	21 36 56.4	N. 32 16		54 N. 8 S.
16	SATURN -	-	23 40 17	17 48 22.60	22 8 8.1	N. 43 27		68 N. 4 N.
17	♊ Sagittarii	4	6 32 3	18 6 0.54	21 5 21.4	S. 41 1		19 S. 90 S.
17	♊ Sagittarii	5	7 6 28	18 7 28.74	S. 20 45 49.4	S. 62 2		42 S. 90 S.
17	♊ Sagittarii	5	22 22 26	18 46 20.35	S. 22 54 1.6	N. 44 40		67 N. 6 N.
17	♊ Sagittarii	5	22 44 47	18 47 16.74	22 49 43.8	N. 40 16		62 N. 1 N.
17	♊ Sagittarii	4	23 49 20	18 49 59.44	21 16 24.8	S. 53 12		36 S. 90 S.
18	♊ Sagittarii	4	2 34 28	18 56 54.57	21 55 39.2	S. 13 36		3 N. 52 S.
18	♊ Sagittarii	3	4 37 34	19 2 2.94	S. 21 13 33.4	S. 54 44		37 S. 90 S.
20	♐ Capricor.	4½	13 0 22	21 15 0.74	S. 17 23 5.1	S. 52 2		25 S. 90 S.
20	♐ Capricor.	3½	21 13 47	21 32 53.50	17 14 47.5	N. 0 50		29 N. 37 S.
21	♐ Capricor.	3	0 29 13	21 39 52.03	16 42 51.1	S. 5 25		24 N. 44 S.
21	♈ Aquarii -	4	9 45 53	21 59 24.95	14 29 53.2	S. 61 7		34 S. 90 S.
22	♊ Aquarii -	4½	20 35 11	23 9 4.40	S. 9 47 42.7	S. 10 27		25 N. 49 S.
22	♊ Aquarii -	4½	21 39 39	23 11 8.59	S. 9 53 30.2	N. 6 26		42 N. 32 S.
22	♊ Aquarii -	5	22 12 24	23 12 11.60	10 19 13.8	N. 37 49		79 N. 0
23	♐ Piscium -	5	21 0 52	23 55 17.18	6 44 11.8	N. 66 11		83 N. 37 N.
23	♐ Piscium -	5	22 50 13	23 58 40.46	S. 6 26 7.4	N. 68 3		84 N. 41 N.
26	♐ Piscium -	4½	3 13 47	1 34 39.24	N. 4 49 38.7	S. 26 54		11 N. 69 S.
26	♋ Ceti - -	4½	20 17 17	2 6 5.74	N. 8 14 2.4	S. 47 29		11 S. 82 S.
27	♋ Ceti - -	4	4 24 33	2 21 14.03	7 52 27.0	N. 59 4		90 N. 28 N.
27	♋ Ceti - -	4	13 15 46	2 37 54.08	9 33 42.6	N. 47 59		90 N. 14 N.
31	♊ Geminor.	3½	18 42 13	6 7 0.74	22 32 26.8	S. 41 46		6 S. 67 S.
31	♊ Geminor.	3	22 18 38	6 15 4.66	N. 22 34 35.3	S. 36 22		0 61 S.
June 1	♊ Geminor.	3½	23 35 42	7 12 20.55	N. 22 13 6.6	S. 4 5		34 N. 20 S.
2	♅ URANUS -	-	5 40 39	7 26 14.76	22 26 34.7	S. 26 14		12 N. 46 S.
5	♈ Leonis -	5	20 24 25	10 42 25.41	11 13 55.8	N. 67 52		90 N. 37 N.
6	♈ Virginis -	4½	22 12 42	11 39 11.26	7 15 25.6	N. 2 12		40 N. 35 S.
7	♈ Virginis -	5	13 57 35	12 13 45.53	N. 4 2 9.4	S. 7 56		31 N. 45 S.
11	♈ Libræ - -	4½	2 44 29	15 28 17.03	S. 14 21 16.4	S. 4 32		28 N. 42 S.
11	♈ Libræ - -	4½	10 8 26	15 46 27.41	16 20 46.3	N. 36 53		68 N. 4 S.
12	B.A.C. 5579	5	5 8 55	16 34 5.22	17 29 16.3	S. 67 32		40 S. 90 S.
12	♎ Ophiuchi	5	20 27 39	17 13 14.79	20 58 12.9	N. 35 51		60 N. 4 S.
13	♎ Ophiuchi	5	5 9 17	17 35 40.38	S. 21 36 56.3	N. 29 32		51 N. 10 S.
13	SATURN -	-	6 58 52	17 40 23.57	S. 22 6 4.9	N. 50 39		68 N. 11 N.
13	B.A.C. 6088	6	12 16 0	17 54 3.68	22 46 26.1	N. 70 36		67 N. 41 N.
13	♊ Sagittarii	4	16 53 29	18 6 1.10	21 5 20.9	S. 44 50		22 S. 90 S.
13	♊ Sagittarii	5	17 27 37	18 7 29.29	20 45 48.8	S. 65 55		47 S. 90 S.
14	♊ Sagittarii	5	8 33 33	18 46 21.02	S. 22 54 0.7	N. 39 30		60 N. 0



# ELEMENTS OF OCCULTATIONS, 1870. 449

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of	At Greenwich Mean Time of $\delta$			Limiting Parallels.
			Apparent ♂ in R. A. of ( and #.	Apparent R. A. of ( and #.	Apparent Declination of #.	Diff. of Apparent Dec. of ( and #.	
			h m s	h m s	° ' "	° ' "	Latitude.
June	14 ♈ Sagittarii	5	8 55 35	18 47 17.42	S. 22 49 42.9	N. 35 5	53 N. 4 S.
	14 ♉ Sagittarii	4	9 59 13	18 50 0.12	21 16 23.7	S. 58 28	42 S. 90 S.
	14 ♈ Sagittarii	4	12 41 54	18 56 55.23	21 55 38.1	S. 19 5	2 S. 59 S.
	14 ♈ Sagittarii	3	14 43 6	19 2 3.61	21 13 32.1	S. 60 22	44 S. 90 S.
	16 ♎ Capricor.	5½	13 57 59	20 57 1.50	S. 20 21 52.8	N. 63 39	70 N. 32 N.
	16 ♎ Capricor.	4½	21 52 9	21 15 1.57	S. 17 23 1.4	S. 60 52	35 S. 90 S.
	17 ♎ Capricor.	3½	5 53 27	21 32 54.38	17 14 43.4	S. 8 16	21 N. 47 S.
	17 ♎ Capricor.	3	9 4 7	21 39 52.89	16 42 47.0	S. 14 37	15 N. 54 S.
	17 ♈ Aquarii -	4	18 7 29	21 59 25.81	14 29 48.7	S. 70 34	50 S. 90 S.
	19 ♊ Aquarii -	4½	4 13 21	23 9 5.29	S. 9 47 37.2	S. 20 15	16 N. 60 S.
	19 ♊ Aquarii -	4½	5 16 41	23 11 9.48	S. 9 53 24.7	S. 3 21	32 N. 42 S.
	19 ♊ Aquarii -	5	5 48 52	23 12 12.49	10 19 8.3	N. 28 2	66 N. 11 S.
	20 ♊ Piscium -	5	4 17 29	23 55 18.04	6 44 6.1	N. 56 40	83 N. 21 N.
	20 ♊ Piscium -	5	6 5 34	23 58 41.32	S. 6 26 1.6	N. 58 34	84 N. 24 N.
	22 ♈ Piscium -	4½	10 11 28	1 34 39.98	N. 4 49 43.5	S. 34 29	4 N. 80 S.
	23 ♈ Ceti - -	4½	3 15 6	2 6 6.47	N. 8 14 6.9	S. 54 10	19 S. 82 S.
	23 ♈ Ceti - -	4	11 22 55	2 21 14.71	7 52 31.1	N. 52 50	90 N. 19 N.
	23 ♈ Ceti - -	4	20 14 54	2 37 54.74	9 33 46.5	N. 42 16	90 N. 7 N.
	25 ♈ Tauri - -	4	21 46 14	4 15 25.72	17 14 3.1	N. 19 22	60 N. 9 S.
	25 ♈ Tauri - -	5	22 59 52	4 17 57.67	N. 17 37 40.6	N. 4 38	43 N. 24 S.
	26 ♈ Tauri - -	3½	0 28 29	4 21 1.00	N. 18 53 18.3	S. 60 27	30 S. 71 S.
	26 MERCURY -	-	14 48 50	4 51 8.95	18 58 13.2	N. 27 50	72 N. 2 N.
	29 URANUS -	-	14 42 37	7 32 48.25	22 12 33.1	S. 15 24	23 N. 34 S.
July	3 ♈ Leonis - -	5	1 44 18	10 42 25.16	11 13 57.2	N. 73 6	90 N. 47 N.
	4 ♈ Virginis -	4½	3 39 8	11 39 10.98	N. 7 15 27.4	N. 7 39	45 N. 29 S.
	4 ♈ Virginis -	5	19 35 24	12 13 45.25	N. 4 2 11.2	S. 2 31	36 N. 40 S.
	8 ♈ Libræ - -	4½	10 35 28	15 28 16.95	S. 14 21 15.8	S. 1 32	30 N. 40 S.
	8 ♈ Libræ - -	4½	18 12 53	15 46 27.37	16 20 45.9	N. 39 34	72 N. 1 S.
	9 B.A.C. 5579	5	13 45 40	16 34 5.27	17 29 16.1	S. 65 39	39 S. 90 S.
	10 ♈ Ophiuchi	5	5 26 41	17 13 14.94	S. 20 58 13.1	N. 37 6	63 N. 3 S.
	10 B.A.C. 5954	6	12 27 43	17 30 58.44	S. 21 49 51.8	N. 51 56	68 N. 13 N.
	10 SATURN -	-	12 53 55	17 32 4.79	22 4 7.3	N. 64 8	68 N. 29 N.
	10 ♈ Ophiuchi	5	14 19 3	17 35 40.58	21 36 56.5	N. 30 27	53 N. 9 S.
	11 ♈ Sagittarii	4	2 15 14	18 6 1.39	21 5 20.8	S. 44 22	22 S. 90 S.
	11 ♈ Sagittarii	5	2 49 52	18 7 29.58	S. 20 45 48.7	S. 65 28	47 S. 90 S.
	11 ♈ Sagittarii	5	18 6 30	18 46 21.40	S. 22 54 0.6	N. 39 26	61 N. 0
	11 ♈ Sagittarii	5	18 28 45	18 47 17.80	22 49 42.8	N. 35 0	53 N. 4 S.
	11 ♈ Sagittarii	4	19 32 55	18 50 0.50	21 16 23.3	S. 58 36	42 S. 90 S.
	11 ♈ Sagittarii	4	22 16 54	18 56 55.64	21 55 37.8	S. 19 18	3 S. 59 S.
12 ♈ Sagittarii	3	0 18 56	19 2 4.04	S. 21 13 31.6	S. 60 39	44 S. 90 S.	
14 ♎ Capricor.	4½	7 18 15	21 15 2.29	S. 17 22 58.7	S. 62 29	37 S. 90 S.	
14 ♎ Capricor.	3½	15 13 52	21 32 55.09	17 14 40.6	S. 10 1	19 N. 48 S.	
14 ♎ Capricor.	3	18 22 6	21 39 53.61	16 42 44.0	S. 16 25	14 N. 56 S.	
15 ♈ Aquarii -	4	3 17 59	21 59 26.57	14 29 45.1	S. 72 28	54 S. 90 S.	
16 ♊ Aquarii -	4½	12 52 3	23 9 6.09	S. 9 47 32.6	S. 22 21	14 N. 63 S.	



# 450 ELEMENTS OF OCCULTATIONS, 1870.

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent O in R.A. of (C and *.	At Greenwich Mean Time of O			Limiting Parallels.
				Apparent R.A. of (C and *.	Apparent Declination of *.	Diff. of Apparent Dec. of (C and *.	
			h m s	h m s	° ' "	° ' "	Latitude.
July 16	♂ Aquarii -	4½	13 54 23	23 11 10 28	S. 9 53 20 1	S. 5 28	30 N. 44 S.
16	♂ Aquarii -	5	14 26 4	23 12 13 29	10 19 3 7	N. 25 55	63 N. 13 S.
17	♂ Piscium -	5	12 34 39	23 55 18 87	6 44 1 0	N. 54 35	83 N. 18 N.
17	♂ Piscium -	5	14 21 17	23 58 42 15	6 25 56 5	N. 56 30	84 N. 20 N.
18	♂ Ceti - -	5½	15 47 7	0 46 23 05	S. 1 50 53 9	N. 70 1	88 N. 44 N.
19	♂ Piscium -	4½	17 58 56	1 34 40 81	N. 4 49 48 6	S. 36 7	2 N. 83 S.
20	♂ Ceti - -	4½	11 0 5	2 6 7 30	8 14 11 8	S. 55 35	21 S. 82 S.
20	♂ Ceti - -	4	19 7 47	2 21 15 52	7 52 36 0	N. 51 31	90 N. 17 N.
21	♂ Ceti - -	4	4 0 22	2 37 55 58	9 33 51 3	N. 41 4	90 N. 6 N.
23	♂ Tauri - -	4	5 42 17	4 15 26 47	N. 17 14 6 0	N. 18 45	59 N. 10 S.
23	♂ Tauri - -	5	6 56 13	4 17 58 42	N. 17 37 43 4	N. 4 2	42 N. 24 S.
23	♂ Tauri - -	3½	8 25 9	4 21 1 71	18 53 20 8	S. 61 3	31 S. 71 S.
24	♂ Tauri - -	3½	16 42 9	5 29 52 28	21 3 35 9	S. 7 35	30 N. 30 S.
25	♂ Orionis -	4½	0 17 26	5 46 40 82	20 14 55 4	N. 69 48	90 N. 63 N.
25	VENUS -	-	3 39 23	5 54 12 44	N. 22 16 39 1	S. 41 9	4 S. 68 S.
25	♂ Geminor.	3½	9 20 46	6 7 1 53	N. 22 32 27 6	S. 41 36	5 S. 67 S.
25	♂ Geminor.	3	12 54 3	6 15 5 42	22 34 36 0	S. 35 59	1 N. 60 S.
27	♂ URANUS -	-	1 26 33	7 39 54 18	21 56 30 4	S. 6 49	31 N. 25 S.
30	♂ Leonis -	5	7 59 50	10 42 25 03	11 13 57 8	N. 71 45	90 N. 43 N.
31	♂ Virginis -	4½	9 27 25	11 39 10 77	N. 7 15 28 4	N. 5 52	44 N. 31 S.
Aug. 1	♂ Virginis -	5	1 10 55	12 13 44 99	N. 4 2 12 5	S. 4 34	34 N. 42 S.
4	♂ Libræ - -	4½	16 29 57	15 28 16 67	S. 14 21 15 0	S. 4 6	28 N. 42 S.
5	♂ Libræ - -	4½	0 16 9	15 46 27 09	16 20 45 3	N. 37 4	69 N. 3 S.
5	B.A.C. 5579	5	20 14 48	16 34 5 07	17 29 15 8	S. 67 54	43 S. 90 S.
6	♂ Ophiuchi	5	12 18 42	17 13 14 80	S. 20 58 13 3	N. 35 8	60 N. 4 S.
6	SATURN -	-	17 39 15	17 26 24 28	S. 22 4 9 5	N. 73 11	68 N. 50 N.
6	♂ Ophiuchi	5	21 24 19	17 35 40 48	21 36 56 8	N. 28 40	51 N. 11 S.
7	♂ Sagittarii	4	9 38 4	18 6 1 34	21 5 21 2	S. 45 51	24 S. 90 S.
7	♂ Sagittarii	5	10 13 32	18 7 29 53	20 45 49 0	S. 66 56	51 S. 90 S.
8	♂ Sagittarii	5	1 51 25	18 46 21 45	S. 22 54 1 2	N. 38 24	60 N. 0
8	♂ Sagittarii	5	2 14 9	18 47 17 85	S. 22 49 43 4	N. 33 58	52 N. 5 S.
8	♂ Sagittarii	4	3 19 44	18 50 0 55	21 16 23 6	S. 59 36	44 S. 90 S.
8	♂ Sagittarii	4	6 7 14	18 56 55 71	21 55 38 2	S. 20 13	3 S. 60 S.
8	♂ Sagittarii	3	8 11 51	19 2 4 12	21 13 31 9	S. 61 30	46 S. 90 S.
9	♂ Capricor.	6	12 14 7	20 10 25 42	S. 22 12 24 1	N. 65 55	68 N. 36 N.
10	♂ Capricor.	4½	15 58 1	21 15 2 67	S. 17 22 57 7	S. 61 17	36 S. 90 S.
10	♂ Capricor.	3½	23 56 19	21 32 55 52	17 14 39 4	S. 8 28	20 N. 47 S.
11	♂ Capricor.	3	3 5 19	21 39 54 07	16 42 42 7	S. 14 44	15 N. 54 S.
11	♂ Aquarii -	4	12 2 33	21 59 27 05	14 29 43 3	S. 70 24	49 S. 90 S.
12	♂ Aquarii -	4½	21 32 5	23 9 6 70	S. 9 47 29 5	S. 18 51	17 N. 58 S.
12	♂ Aquarii -	4½	22 34 5	23 11 10 89	S. 9 53 17 0	S. 1 55	33 N. 40 S.
12	♂ Aquarii -	5	23 5 36	23 12 13 91	10 19 0 8	N. 29 30	68 N. 10 S.
13	♂ Piscium -	5	21 5 18	23 55 19 54	6 43 57 3	N. 59 4	83 N. 24 N.
13	♂ Piscium -	5	22 51 7	23 58 42 83	S. 6 25 52 8	N. 61 2	84 N. 27 N.
16	♂ Piscium -	4½	2 7 12	1 34 41 61	N. 4 49 53 4	S. 30 0	9 N. 73 S.



# ELEMENTS OF OCCULTATIONS, 1870. 451

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ♂ in R.A. of ( and *. )	At Greenwich Mean Time of ♂			Limiting Parallels.
				Apparent R.A. of ( and *. )	Apparent Declination of *. )	Diff. of Apparent Dec. of ( and *. )	
			h m s	h m s	° ' "	° ' "	Latitude.
Aug. 16	♂ Ceti - - -	4½	19 44 5	2 6 8.11	N. 8 14 16.4	S. 49 10	12 S. 82 S.
17	♂ Ceti - - -	4	3 11 44	2 21 16.35	7 52 40.6	N. 58 2	90 N. 26 N.
17	μ Ceti - - -	4	12 4 21	2 37 56.40	9 33 55.7	N. 47 40	90 N. 14 N.
19	♂ Tauri - - -	4	14 1 17	4 15 27.29	17 14 9.0	N. 25 6	68 N. 4 S.
19	♂ Tauri - - -	6	14 35 38	4 16 37.23	N. 17 8 28.3	N. 34 53	85 N. 6 N.
19	♂ Tauri - - -	5	15 15 52	4 17 59.24	N. 17 37 46.4	N. 10 21	49 N. 18 S.
19	♂ Tauri - - -	3½	16 45 35	4 21 2.54	18 53 23.6	S. 54 44	21 S. 71 S.
21	ζ Tauri - - -	3½	1 21 21	5 29 52.96	21 3 37.4	S. 2 5	36 N. 24 S.
21	η Geminor. 3½	18	9 25	6 7 2.25	22 32 28.3	S. 36 40	0 62 S.
21	μ Geminor. 3	21	44 30	6 15 6.12	N. 22 34 36.4	S. 31 13	6 N. 53 S.
22	♂ Geminor. 3½	22	41 47	7 12 21.60	N. 22 13 6.3	N. 1 13	39 N. 15 S.
23	MARS - - -	-	4 34 38	7 26 5.07	22 46 26.3	S. 40 43	3 S. 67 S.
23	URANUS - - -	-	13 17 46	7 46 32.61	21 40 43.7	N. 4 42	88 N. 16 S.
24	VENUS - - -	-	7 10 32	8 28 44.81	19 22 35.1	N. 68 59	90 N. 52 N.
28	♂ Virginis - 5	8	28 18	12 13 44.83	N. 4 2 12.8	S. 10 35	29 N. 48 S.
31	γ Libræ - - -	4½	22 1 29	15 28 16.26	S. 14 21 14.1	S. 13 48	19 N. 52 S.
Sept. 1	θ Libræ - - -	4½	5 44 11	15 46 26.67	16 20 44.5	N. 27 23	58 N. 13 S.
2	ξ Ophiuchi -	5	17 47 24	17 13 14.41	20 58 13.4	N. 26 10	50 N. 13 S.
2	SATURN - - -	-	22 43 5	17 25 17.26	22 8 6.8	N. 70 32	68 N. 43 N.
3	58 Ophiuchi - 5	2	57 19	17 35 40.09	S. 21 36 57.1	N. 20 2	41 N. 19 S.
3	♂ Sagittarii 4	15	19 9	18 6 1.03	S. 21 5 21.6	S. 53 57	34 S. 90 S.
4	♂ Sagittarii 5	7	46 28	18 46 21.18	22 54 2.2	N. 31 10	49 N. 8 S.
4	♂ Sagittarii 5	8	9 33	18 47 17.58	22 49 44.3	N. 26 46	43 N. 12 S.
4	B.A.C. 6448 6	8	31 17	18 48 10.68	23 20 1.8	N. 56 59	67 N. 22 N.
4	♂ Sagittarii 4	9	16 11	18 50 0.29	S. 21 16 24.4	S. 66 44	55 S. 90 S.
4	♂ Sagittarii 4	12	6 26	18 56 55.46	S. 21 55 39.1	S. 27 11	10 S. 70 S.
4	♂ Sagittarii 3	4	13 8	19 2 3.87	21 13 32.7	S. 68 20	57 S. 90 S.
6	♂ Capricor. 4½	22	59 32	21 15 2.72	17 22 58.1	S. 63 50	40 S. 90 S.
7	γ Capricor. 3½	7	5 33	21 32 55.62	17 14 39.8	S. 10 18	19 N. 49 S.
7	♂ Capricor. 3	10	17 27	21 39 54.17	S. 16 42 43.0	S. 16 16	14 N. 56 S.
7	♂ Aquarii - 4	19	22 24	21 59 27.20	S. 14 29 43.2	S. 71 5	52 S. 90 S.
9	♂ Aquarii - 4½	5	12 48	23 9 7.02	9 47 28.4	S. 16 9	20 N. 55 S.
9	♂ Aquarii - 4½	6	15 14	23 11 11.22	9 53 15.9	N. 0 53	36 N. 37 S.
9	♂ Aquarii - 5	6	46 57	23 12 14.24	10 18 59.7	N. 32 21	72 N. 7 S.
10	30 Piscium - 5	4	52 46	23 55 19.97	S. 6 43 55.5	N. 64 7	83 N. 31 N.
10	33 Piscium - 5	6	38 51	23 58 43.26	S. 6 25 50.9	N. 66 15	84 N. 35 N.
12	♂ Piscium - 4½	9	53 0	1 34 42.21	N. 4 49 56.7	S. 20 22	18 N. 60 S.
13	♂ Ceti - - - 4½	2	48 29	2 6 8.79	8 14 20.0	S. 38 25	0 82 S.
13	♂ Ceti - - - 4	10	54 46	2 21 17.03	7 52 43.9	N. 69 15	90 N. 46 N.
13	μ Ceti - - - 4	19	47 1	2 37 57.10	N. 9 33 59.1	N. 59 19	90 N. 29 N.
15	♂ Tauri - - - 4	21	54 56	4 15 28.11	N. 17 14 11.6	N. 38 6	90 N. 10 N.
15	♂ Tauri - - - 5	23	10 7	4 18 0.06	17 37 48.9	N. 23 22	66 N. 5 S.
16	♂ Tauri - - - 3½	0	40 38	4 21 3.40	18 53 26.1	S. 41 43	5 S. 71 S.
16	♂ Tauri - - - 5½	11	47 2	4 43 47.89	18 37 0.4	N. 46 45	90 N. 22 N.



# 152 ELEMENTS OF OCCULTATIONS, 1870.

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ☉ in R. A. of ( and #.	At Greenwich Mean Time of ☉			Limiting Parallels.
			Apparent R. A. of ( and #.	Apparent Declination of #.	Diff. of Apparent Dec. of ( and #.		
			h m s	h m s	° ' "	° ' "	Latitude.
Sept. 18	γ Geminor.	3½	2 43 52	6 7 3 10	N.22 32 28 8	S.24 21	13 N. 45 S.
	μ Geminor.	3	6 22 39	6 15 6 96	22 34 36 7	S.19 1	19 N. 38 S.
	δ Geminor.	3½	7 46 45	7 12 22 37	22 13 5 4	N.12 17	52 N. 5 S.
	URANUS -	-	0 52 47	7 51 44 84	21 28 0 0	N.20 2	61 N. 1 S.
	MARS - -	-	22 35 46	8 42 16 45	N.19 23 52 4	N.43 58	90 N. 17 N.
23	ι Leonis -	5	2 15 24	10 42 25 34	N.11 13 55 5	N.71 33	90 N. 40 N.
28	γ Libræ - -	4½	5 9 33	15 28 15 86	S.14 21 13 3	S.26 46	8 N. 66 S.
28	θ Libræ - -	4½	12 38 14	15 46 26 26	16 20 43 7	N.13 59	44 N. 26 S.
29	ξ Ophiuchi	5	23 45 42	17 13 13 92	20 58 13 1	N.11 44	34 N. 27 S.
30	SATURN -	-	6 11 51	17 29 17 39	S.22 16 1 3	N.56 15	68 N. 18 N.
30	58 Ophiuchi	5	8 44 59	17 35 39 61	S.21 36 57 2	N. 5 36	27 N. 33 S.
Oct. 30	μ Sagittarii	4	20 55 13	18 6 0 54	21 5 22 0	S.68 16	52 S. 90 S.
	B.A.C. 6343	6	6 50 11	18 30 37 73	23 36 44 4	N.64 29	66 N. 32 N.
1	ν Sagittarii	5	13 12 12	18 46 20 71	22 54 3 0	N.17 16	32 N. 22 S.
1	ν Sagittarii	5	13 35 7	18 47 17 11	S.22 49 45 1	N.12 53	27 N. 26 S.
1	ο Sagittarii	4	17 30 26	18 56 55 00	S.21 55 40 0	S.40 56	23 S. 90 S.
4	γ Capricor.	3½	12 46 57	21 32 55 41	17 14 41 3	S.19 37	10 N. 60 S.
4	δ Capricor.	3	16 1 9	21 39 53 98	16 42 44 5	S.25 16	6 N. 67 S.
5	56 Aquarii -	6	12 43 3	22 23 21 54	15 14 44 3	N.73 1	75 N. 54 N.
6	ψ Aquarii -	4½	11 30 11	23 9 7 03	S. 9 47 29 1	S.20 17	16 N. 61 S.
6	ψ Aquarii -	4½	12 33 24	23 11 11 24	S. 9 53 16 6	S. 3 7	33 N. 42 S.
6	ψ Aquarii -	5	13 5 32	23 12 14 26	10 19 0 5	N.28 25	67 N. 11 S.
7	30 Piscium -	5	11 26 31	23 55 20 09	6 43 55 7	N.63 5	83 N. 30 N.
7	33 Piscium -	5	13 13 40	23 58 43 40	S. 6 25 51 1	N.65 28	84 N. 33 N.
9	ν Piscium -	4½	16 46 41	1 34 42 59	N. 4 49 58 1	S.14 23	24 N. 53 S.
10	ε Ceti - -	4½	9 43 46	2 6 9 24	N. 8 14 21 8	S.30 25	8 N. 72 S.
11	38 Arietis -	5	2 41 19	2 37 55 38	11 54 2 0	S.71 4	51 S. 78 S.
11	μ Ceti - -	4	2 42 30	2 37 57 64	9 34 1 0	N.69 9	90 N. 47 N.
13	δ Tauri - -	4	4 52 22	4 15 28 86	17 14 13 3	N.52 2	90 N. 26 N.
13	δ Tauri - -	5	6 7 48	4 18 0 82	N.17 37 50 6	N.37 22	90 N. 9 N.
13	ε Tauri - -	3½	7 38 37	4 21 4 14	N.18 53 27 8	S.27 38	10 N. 58 S.
14	ζ Tauri - -	3½	16 50 56	5 29 54 59	21 3 39 3	N.26 12	71 N. 4 N.
14	JUPITER -	-	23 44 59	5 44 38 60	22 50 37 2	S.55 27	23 S. 67 S.
15	ι Geminor.	5	5 8 36	5 56 15 29	23 16 1 6	S.64 27	40 S. 67 S.
15	η Geminor.	3½	10 7 54	6 7 3 96	N.22 32 28 7	S. 8 27	30 N. 27 S.
15	μ Geminor.	3	13 49 59	6 15 7 82	N.22 34 36 4	S. 3 3	35 N. 21 S.
16	δ Geminor.	3½	15 42 38	7 12 23 22	22 13 3 9	N.28 16	74 N. 11 N.
17	URANUS -	-	10 30 12	7 54 40 79	21 21 3 3	N.38 23	90 N. 17 N.
21	ν Virginis -	4½	13 35 41	11 39 11 15	7 15 23 8	N. 6 56	45 N. 31 S.
21	B.A.C. 3996	6	15 2 22	11 42 27 48	N. 5 54 55 9	N.68 2	90 N. 29 N.
22	ε Virginis -	5	4 49 11	12 13 45 13	N. 4 2 9 0	S. 9 25	30 N. 47 S.
25	θ Libræ - -	4½	22 5 23	15 46 26 04	S.16 20 43 4	N. 3 38	34 N. 35 S.
27	ξ Ophiuchi	5	7 59 13	17 13 13 53	20 58 12 8	S. 2 1	22 N. 41 S.
27	58 Ophiuchi	5	16 39 5	17 35 39 20	21 36 56 9	S. 8 45	14 N. 47 S.
27	SATURN -	-	17 31 20	17 37 54 47	S.22 25 37 3	N.36 0	59 N. 5 S.



Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ♂ in R. A. of ( and #.	At Greenwich Mean Time of ♂			Limiting Parallels.
				Apparent R. A. of ( and #.	Apparent Declination of #.	Diff. of Apparent Dec. of ( and #.	
			h m s	h m s	° ' "	°	Latitude.
Oct. 28	♂ Sagittarii	5	20 8 29	18 46 20.24	S. 22 54 3.4	N. 1 39	16 N. 37 S.
28	♂ Sagittarii	5	20 30 41	18 47 16.64	22 49 45.5	S. 2 45	12 N. 41 S.
29	♂ Sagittarii	4	0 18 49	18 56 54.52	21 55 40.5	S. 56 40	39 S. 90 S.
30	4 Capricor.	6	6 10 15	20 10 24.47	22 12 28.2	N. 32 53	57 N. 6 S.
31	γ Capricor.	3½	18 18 20	21 32 55.03	S. 17 14 43.2	S. 34 30	4 S. 82 S.
31	δ Capricor.	3	21 31 15	21 39 53.61	S. 16 42 46.4	S. 39 59	9 S. 90 S.
Nov. 2	♂ Aquarii	4½	17 1 0	23 9 6.82	9 47 30.9	S. 31 44	5 N. 77 S.
2	♂ Aquarii	4½	18 4 34	23 11 11.03	9 53 18.4	S. 14 28	22 N. 54 S.
2	♂ Aquarii	5	18 36 52	23 12 14.06	10 19 2.3	N. 17 7	54 N. 22 S.
3	30 Piscium	5	17 7 28	23 55 19.99	S. 6 43 57.3	N. 54 11	83 N. 17 N.
3	33 Piscium	5	18 55 30	23 58 43.30	S. 6 25 52.6	N. 56 46	84 N. 20 N.
5	♂ Piscium	4½	22 53 13	1 34 42.74	N. 4 49 58.0	S. 16 29	23 N. 56 S.
6	♂ Ceti - -	4½	15 55 29	2 6 9.46	8 14 22.2	S. 30 17	9 N. 72 S.
7	38 Arietis	5	8 55 55	2 37 55.69	11 54 2.8	S. 68 44	43 S. 78 S.
7	μ Ceti - -	4	8 57 7	2 37 57.95	N. 9 34 1.3	N. 71 30	90 N. 54 N.
9	♂ Tauri - -	4	11 4 34	4 15 29.42	N. 17 14 13.9	N. 60 4	90 N. 37 N.
9	♂ Tauri - -	5	12 19 50	4 18 1.39	17 37 51.3	N. 45 32	90 N. 18 N.
9	♂ Tauri - -	3½	13 50 25	4 21 4.71	18 53 28.6	S. 19 19	19 N. 48 S.
10	♂ Tauri - -	5	6 33 28	4 55 22.75	21 24 9.4	S. 63 23	37 S. 69 S.
10	ξ Tauri - -	3½	22 59 44	5 29 55.43	N. 21 3 39.3	N. 37 22	90 N. 15 N.
11	JUPITER -	-	3 20 46	5 39 11.62	N. 22 49 16.9	S. 51 26	17 S. 67 S.
11	♂ Geminor.	5	11 18 4	5 56 16.08	23 16 1.5	S. 52 26	19 S. 67 S.
11	η Geminor.	3½	16 18 8	6 7 4.76	22 32 28.3	N. 3 54	43 N. 15 S.
11	μ Geminor.	3	20 0 59	6 15 8.63	22 34 35.8	N. 9 32	49 N. 8 S.
12	δ Geminor.	3½	22 4 47	7 12 24.10	N. 22 13 2.2	N. 42 11	90 N. 25 N.
13	URANUS -	-	17 12 2	7 54 50.93	N. 21 21 34.3	N. 52 11	90 N. 33 N.
14	39 Cancrī	6	10 12 40	8 32 39.64	20 27 42.9	N. 33 37	82 N. 8 N.
14	40 Cancrī	6	10 15 1	8 32 44.87	20 25 32.9	N. 35 34	87 N. 10 N.
14	γ Cancrī	4½	11 37 24	8 35 47.77	21 55 54.1	S. 62 4	31 S. 68 S.
16	♂ Leonis	3½	1 53 33	10 0 16.12	N. 17 23 32.4	S. 75 13	57 S. 73 S.
17	♂ Virginis	4½	23 10 15	11 39 11.81	N. 7 15 19.0	N. 18 55	58 N. 20 S.
18	π Virginis	4½	6 1 50	11 54 13.67	7 20 11.8	S. 76 29	44 S. 83 S.
18	c Virginis	5	14 54 31	12 13 45.72	N. 4 2 4.5	N. 0 57	40 N. 38 S.
24	SATURN -	-	8 24 46	17 49 57.22	S. 22 33 31.8	N. 16 24	36 N. 24 S.
25	♂ Sagittarii	5	5 38 31	18 46 19.96	S. 22 54 3.4	S. 8 45	7 N. 48 S.
25	♂ Sagittarii	5	5 59 56	18 47 16.37	S. 22 49 45.6	S. 13 11	3 N. 52 S.
25	♂ Sagittarii	4	9 39 58	18 56 54.24	21 55 40.7	S. 67 22	52 S. 90 S.
28	γ Capricor.	3½	1 25 33	21 32 54.63	17 14 44.9	S. 47 50	17 S. 90 S.
28	δ Capricor.	3	4 33 13	21 39 53.22	16 42 48.1	S. 53 21	23 S. 90 S.
29	♂ Aquarii	4½	23 11 57	23 9 6.51	S. 9 47 33.0	S. 44 25	7 S. 90 S.
30	♂ Aquarii	4½	0 14 45	23 11 10.71	S. 9 53 20.6	S. 27 6	10 N. 70 S.
30	♂ Aquarii	5	0 46 40	23 12 13.74	10 19 4.5	N. 4 30	40 N. 34 S.
30	30 Piscium	5	23 6 18	23 55 19.74	6 43 59.4	N. 42 39	74 N. 3 N.
Dec. 1	33 Piscium	5	0 53 50	23 58 43.04	S. 6 25 54.8	N. 45 21	84 N. 6 N.



# 54 ELEMENTS OF OCCULTATIONS, 1870.

Month and Day.	Star's Name.	Magnitude.	Greenwich Mean Time of Apparent ♂ in R. A. of ♄ and ♀.	At Greenwich Mean Time of ♂			Limiting Parallels.
			Apparent R. A. of ♄ and ♀.	Apparent Declination of ♀.	Diff. of Apparent Dec. of ♄ and ♀.		
			h m s	h m s	° ' "	° ' "	Latitude.
Dec. 3	♄ Ceti - - -	4½	22 1 11	2 6 9.47	N. 8 14 21.4	S. 36 12	3 N. 81 S.
4	B.A.C. 830	6	13 49 6	2 35 32.09	10 11 22.1	N. 16 20	57 N. 20 S.
4	38 Arietis	5	15 5 44	2 37 55.78	11 54 2.5	S. 73 3	60 S. 78 S.
4	♄ Ceti - - -	4	15 6 55	2 37 58.03	9 34 0.7	N. 67 11	90 N. 42 N.
6	B.A.C. 1272	6	9 51 43	4 0 36.31	N. 16 59 33.2	N. 18 11	60 N. 12 S.
6	♄ Tauri - - -	4	17 16 5	4 15 29.77	N. 17 14 13.9	N. 60 24	90 N. 37 N.
6	♄ Tauri - - -	5	18 31 8	4 18 1.74	17 37 51.4	N. 45 58	90 N. 18 N.
6	♄ Tauri - - -	3½	20 1 27	4 21 5.08	18 53 28.9	S. 18 46	20 N. 48 S.
7	♄ Tauri - - -	5	12 40 14	4 55 23.21	21 24 9.7	S. 61 25	33 S. 69 S.
7	♄ Tauri - - -	5½	14 57 32	5 0 10.47	N. 20 14 42.6	N. 20 59	64 N. 4 S.
8	JUPITER	-	2 56 52	5 25 31.76	N. 22 42 48.0	S. 67 24	47 S. 67 S.
8	♄ Tauri - - -	3½	5 0 39	5 29 56.15	21 3 39.2	N. 40 37	90 N. 19 N.
8	♄ Geminor.	5	17 13 46	5 56 16.70	23 16 1.3	S. 48 18	14 S. 67 S.
8	♄ Geminor.	3½	22 11 41	6 7 5.40	22 32 27.9	N. 8 22	48 N. 10 S.
9	♄ Geminor.	3	1 52 56	6 15 9.31	N. 22 34 35.2	N. 14 15	55 N. 4 S.
10	♄ Geminor.	3½	3 46 39	7 12 24.89	N. 22 13 0.7	N. 48 30	90 N. 33 N.
10	URANUS - - -	-	21 41 29	7 52 19.57	21 29 12.7	N. 55 26	90 N. 37 N.
11	♄ Cancri - - -	6	12 29 38	8 25 14.31	20 52 37.6	N. 33 27	83 N. 9 N.
11	39 Cancri	6	15 50 59	8 32 40.52	20 27 39.8	N. 41 41	90 N. 17 N.
11	40 Cancri - -	6	15 53 21	8 32 45.75	N. 20 25 29.8	N. 43 38	90 N. 19 N.
11	♄ Cancri - - -	4½	17 15 59	8 35 48.66	N. 21 55 51.1	S. 53 57	19 S. 68 S.
13	♄ Leonis - - -	3½	7 55 4	10 0 17.03	17 23 27.7	S. 66 1	34 S. 73 S.
15	♄ Virginis - -	5	6 5 3	11 38 36.85	8 58 35.5	S. 71 49	38 S. 81 S.
15	♄ Virginis - -	4½	6 21 59	11 39 12.69	7 15 13.1	N. 28 0	69 N. 12 S.
15	♄ Virginis - -	4½	13 27 49	11 54 14.52	N. 7 20 6.0	S. 67 35	30 S. 83 S.
15	♄ Virginis - -	5	22 39 57	12 13 46.54	N. 4 1 58.8	N. 9 33	48 N. 30 S.
19	♄ Libræ - - -	4½	12 55 10	15 28 16.38	S. 14 21 17.0	S. 34 54	2 N. 78 S.
19	♄ Libræ - - -	4½	20 16 10	15 46 26.65	16 20 46.3	N. 3 14	34 N. 36 S.
25	♄ Capricor.	3½	10 49 7	21 32 54.39	17 14 45.9	S. 53 19	22 S. 90 S.
25	♄ Capricor.	3	13 50 57	21 39 52.96	S. 16 42 49.2	S. 58 55	29 S. 90 S.
27	♄ Aquarii - -	4½	7 14 52	23 9 6.20	S. 9 47 34.9	S. 50 25	13 S. 90 S.
27	♄ Aquarii - -	4½	8 16 4	23 11 10.41	9 53 22.4	S. 33 7	5 N. 78 S.
27	♄ Aquarii - -	5	8 47 10	23 12 13.43	10 19 6.4	S. 1 31	34 N. 40 S.
28	30 Piscium - -	5	6 36 31	23 55 19.42	6 44 1.5	N. 36 47	81 N. 3 S.
28	33 Piscium - -	5	8 21 59	23 58 42.74	S. 6 25 56.8	N. 39 30	84 N. 1 S.
30	♄ Piscium - -	4½	11 46 22	1 34 42.45	N. 4 49 55.2	S. 28 41	11 N. 71 S.
31	♄ Ceti - - -	4½	4 50 10	2 6 9.27	8 14 20.0	S. 40 23	1 S. 80 S.
31	♄ Ceti - - -	4	13 0 9	2 21 17.67	7 52 43.6	N. 70 18	90 N. 47 N.
31	♄ Ceti - - -	4	21 55 57	2 37 57.90	N. 9 33 59.4	N. 63 35	90 N. 34 N.



# OCCULTATIONS OF PLANETS AND FIXED STARS BY THE MOON, VISIBLE AT GREENWICH.

\*\*\* The Angles are reckoned towards the right hand round the circumference of the Moon's image as seen in an inverting telescope.

Month and Day.	Star's Name.	Magnitude.	Disappearance.				Reappearance.			
			Sidereal Time.	Mean Time.	Angle from		Sidereal Time.	Mean Time.	Angle from	
					N. Point.	Ver- tex.			N. Point.	Ver- tex.
			h m	h m	°	°	h m	h m	°	°
Jan. 15	15 Geminorum	6	5 32	9 52	120	106	6 43	11 2	249	256
15	16 Geminorum	6	5 42	10 2	50	39	6 39	10 58	318	324
16	56 Geminorum	5½	3 25	7 41	74	33	4 29	8 45	292	255
17	δ Cancri - -	4	15 25	19 35	114	152	16 5	20 15	220	255
25	49 Libræ - -	5½	12 34	16 13	117	88	13 19	16 58	198	175
Feb. 7	μ Ceti - - -	4	9 3	11 51	120	158	9 57†	12 46	270	306
9	63 Tauri - - -	6	10 30	13 10	103	142	11 26	14 6	273	309
10	π Tauri - - -	5½	6 31	9 8	42	65	7 13	9 50	337	7
11	χ¹ Orionis - -	4½	2 16	4 50	140	100	3 12	5 46	245	210
11	χ¹ Orionis - -	6	2 50†	5 24	12	335				
11	χ¹ Orionis - -	5	8 11	10 44	5	36	8 15	10 48	0	32
12	ζ Geminorum	4	9 32	12 1	55	91	10 33	13 2	293	333
15	34 Leonis - -	6	15 20†	17 36	160	200				
16	l Leonis - - -	5	4 41	6 55	77	38	5 37	7 50	253	214
17	B.A.C. 3996 -	6	6 19	8 29	49	10	7 12	9 22	271	233
17	δ Virginis - -	6	12 57†	15 5	332	345				
21	η Libræ - - -	6	12 55	14 48	102	78	13 52	15 45	211	194
23	58 Ophiuchi -	5	16 37†	18 22	348	339				
Mar. 13	δ Cancri - - -	4	15 31	16 4	90	128	16 19†	16 53	243	278
21	χ Ophiuchi - -	6	17 13†	17 15	164	173				
22	ξ Ophiuchi - -	5	14 21	14 19	29	4	15 11	15 9	299	280
24	B.A.C. 6607 -	6	16 20	16 11	46	20	17 16	17 7	310	293
Apr. 8	56 Geminorum	5½	14 55	13 47	7	41	15 7	13 59	340	13
11	34 Leonis - - -	6	15 35	14 15	92	132	16 24	15 4	228	266
13	δ Virginis - -	6	14 16	12 48	345	11	14 30	13 2	320	348
17	θ Libræ - - -	4½	14 0	12 16	113	96	14 49	13 6	202	193
19	SATURN - - -	-	16 47	14 55	106	95	17 57	16 5	237	238
20	σ Sagittarii -	5	14 2†	12 6	65	28	15 2	13 6	281	250
May 14	θ Libræ - - -	6	14 59	11 29	22	20	15 51	12 21	290	296
16	ξ Ophiuchi - -	5	12 11†	8 34	93	56	13 7½	9 29	235	202
16	B.A.C. 5866 -	6	13 51	10 13	71	42	14 57	11 19	257	236
June 11	θ Libræ - - -	4½	15 3	9 43	151	143	15 11	9 51	165	158
13	B.A.C. 6088 -	6	17 24	11 55	27	22	18 7	12 38	317	319
16	η Capricorni -	5½	18 30	12 50	74	52	19 38	13 58	309	296
July 10	B.A.C. 5954 -	6	19 53	12 38	101	123	20 59	13 44	250	280
10	SATURN - - -	-	20 31	13 16	54	80	21 27	14 12	299	332
17	30 Piscium - -	5	18 38	10 56	119	81	19 42	11 59	284	249
17	33 Piscium - -	5	20 37	12 55	109	79	21 52	14 9	303	282
18	20 Ceti - - -	5½	22 37†	14 50	29	7				
30	l Leonis - - -	5	17 29	8 56	19	56	18 1†	9 28	301	337



# OCCULTATIONS OF PLANETS AND FIXED STARS BY THE MOON, VISIBLE AT GREENWICH.

\* \* The Angles are reckoned towards the right hand round the circumference of the Moon's image as seen in an inverting telescope.

Month and Day.	Star's Name.	Magnitude.	Disappearance.				Reappearance.			
			Sidereal Time.	Mean Time.	Angle from		Sidereal Time.	Mean Time.	Angle from	
					N. Point.	Ver- tex.			N. Point.	Ver- tex.
Aug. 9	4 Capricorni -	6	h m 21 31	h m 12 18	° 42	° 55	h m 22 6	h m 12 53	° 345	° 4
17	μ Ceti - - -	4	20 14	10 29	136	97	21 8	11 23	269	230
19	δ Tauri - - -	4	22 53†	13 0	199	158				
19	δ Tauri - - -	6	23 6	13 14	154	113	23 51	13 58	246	206
Sept. 4	B.A.C. 6448 -	6	19 2	8 7	86	88	20 20	9 25	278	292
13	ε Ceti - - -	4	20 57	9 27	30	351	21 4	9 33	18	339
16	ι Tauri - - -	5½	21 53	10 11	112	75	22 49	11 7	280	240
30	SATURN - - -	-	18 41	6 4	87	99	19 55	7 18	260	282
Oct. 1	B.A.C. 6343 -	6	19 22	6 41	57	65	20 26	7 45	304	322
6	ψ Aquarii - -	5	2 44	13 42	137	168	3 46	14 44	276	311
7	30 Piscium - -	5	0 26†	11 20	31	36				
14	ζ Tauri - - -	3½	6 7	16 33	99	110	7 30	17 55	276	306
16	δ Geminorum	3½	4 6	14 24	95	56	5 22	15 41	270	242
30	4 Capricorni -	6	21 6†	6 30	192	201				
Nov. 9	δ Tauri - - -	4	1 19†	10 3	22	348				
9	δ Tauri - - -	5	2 41	11 26	55	32	3 27	12 11	347	333
13	URANUS - - -	-	9 12†	17 39	349	10				
14	39 Cancrī - -	6	0 24†	8 49	115	83	1 10	9 34	237	202
14	40 Cancrī - -	6	0 25†	8 50	107	75	1 14	9 38	246	210
Dec. 4	B.A.C. 830 -	6	7 43	14 48	156	195	8 25	15 30	240	279
6	B.A.C. 1272 -	6	2 42†	9 40	204	184				
7	ι Tauri - - -	5½	8 36	15 30	126	166	9 37	16 30	246	287
8	ζ Tauri - - -	3½	20 57†	3 48	141	111	21 36	4 27	241	208
11	η Cancrī - - -	6	4 26	11 4	67	26	5 34	12 12	284	247
11	39 Cancrī - -	6	9 10	15 48	29	40	10 6	16 43	301	325
11	40 Cancrī - -	6	9 21	15 58	18	32	10 4	16 42	311	335
28	30 Piscium - -	5	1 3	6 35	134	146	2 17	7 49	288	312
28	33 Piscium - -	5	3 15	8 46	95	125	4 17	9 48	321	355

† Below the horizon.

† A near approach.

§ Rising.



## MEAN TIME.

## JANUARY.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
1	II. Oc. D.	0	17		8	II. Oc. D.	2	44		15	III. Oc. D.	3	42	
	III. Ec. D.	1	3	51.7		I. Tr. I. †	4	10			II. Oc. D.*	5	13	
	I. Tr. I.	2	20			III. Ec. D.*	5	5	38.6		III. Oc. R.*	5	55	
	III. Ec. R.	2	51	4.6		II. Oc. R.*	5	6			I. Tr. I.*	6	2	
	I. Sh. I.	3	29			II. Ec. D.*	5	12	36.3		I. Sh. I.*	7	20	
	I. Tr. E. †	4	32			I. Sh. I.*	5	24			II. Oc. R.*	7	36	
	II. Ec. R. †	4	53	20.2		I. Tr. E.*	6	23			II. Ec. D.*	7	48	16.7
	I. Sh. E.*	5	41			III. Ec. R.*	6	52	57.0		I. Tr. E.*	8	15	
	I. Oc. D.	23	33			II. Ec. R.*	7	29	9.9		III. Ec. D.*	9	7	39.5
2	I. Ec. R.	2	52	43.1		I. Sh. E.*	7	37			I. Sh. E.*	9	32	
	II. Tr. I.	18	52		9	I. Oc. D.	1	24			II. Ec. R.*	10	5	2.2
	I. Tr. I.	20	47			I. Ec. R. †	4	48	40.0		III. Ec. R.*	10	55	5.8
	II. Sh. I.	21	11			II. Tr. I.	21	22		16	I. Oc. D.	3	17	
	II. Tr. E.	21	13			I. Tr. I.	22	38			I. Ec. R.*	6	44	39.2
	I. Sh. I.	21	58			II. Tr. E.	23	44			II. Tr. I.	23	55	
	I. Tr. E.	22	59			II. Sh. I.	23	50		17	I. Tr. I.	0	30	
	II. Sh. E.	23	33			I. Sh. I.	23	53			I. Sh. I.	1	49	
3	I. Sh. E.	0	10		10	I. Tr. E.	0	51			II. Tr. E.	2	18	
	I. Oc. D.	18	0			I. Sh. E.	2	5			II. Sh. I.	2	29	
	I. Ec. R.	21	21	45.6		II. Sh. E.	2	12			I. Tr. E.	2	43	
4	III. Tr. I.*	10	11			I. Oc. D.	19	52			I. Sh. E.	4	1	
	III. Tr. E.*	12	20			I. Ec. R.	23	17	43.1		II. Sh. E. †	4	51	
	II. Oc. D.*	13	30		11	III. Tr. I. †	13	55			I. Oc. D.	21	45	
	III. Sh. I.	15	4			II. Oc. D.	15	58		18	I. Ec. R.	1	13	42.6
	I. Tr. I.	15	15			III. Tr. E.	16	7			III. Tr. I.	17	45	
	II. Oc. R.	15	52			I. Tr. I.	17	6			II. Oc. D.	18	28	
	II. Ec. D.	15	54	46.7		II. Oc. R.	18	21			I. Tr. I.	18	59	
	I. Sh. I.	16	27			I. Sh. I.	18	22			III. Tr. E.	19	59	
	III. Sh. E.	17	7			II. Ec. D.	18	30	26.4		I. Sh. I.	20	17	
	I. Tr. E.	17	27			III. Sh. I.	19	6			II. Oc. R.	20	52	
	II. Ec. R.	18	11	14.7		I. Tr. E.	19	18			II. Ec. D.	21	6	8.3
	I. Sh. E.	18	39			I. Sh. E.	20	34			I. Tr. E.	21	11	
5	I. Oc. D.*	12	28			II. Ec. R.	20	47	5.9		I. Sh. E.	22	30	
	I. Ec. R.	15	50	42.4		III. Sh. E.	21	9			III. Sh. I.	23	8	
6	II. Tr. I.*	8	6		12	I. Oc. D. †	14	20			II. Ec. R.	23	23	0.1
	I. Tr. I.*	9	42			I. Ec. R.	17	46	40.5	19	III. Sh. E.	1	11	
	II. Tr. E.*	10	28		13	II. Tr. I.*	10	38			I. Oc. D.	16	14	
	II. Sh. I.*	10	30			I. Tr. I.*	11	34			I. Ec. R.	19	42	40.4
	I. Sh. I.*	10	55			I. Sh. I.*	12	51		20	II. Tr. I. †	13	12	
	I. Tr. E.*	11	55			II. Tr. E.*	13	0			I. Tr. I. †	13	27	
	II. Sh. E.*	12	52			II. Sh. I.*	13	9			I. Sh. I.	14	46	
	I. Sh. E.*	13	8			I. Tr. E. †	13	46			II. Tr. E.	15	35	
7	I. Oc. D.*	6	56			I. Sh. E.	15	3			I. Tr. E.	15	39	
	I. Ec. R.*	10	19	45.0		II. Sh. E.	15	31			II. Sh. I.	15	48	
	III. Oc. D.	23	55		14	I. Oc. D.*	8	48			I. Sh. E.	16	58	
8	III. Oc. R.	2	5			I. Ec. R.*	12	15	43.8		II. Sh. E.	18	10	

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.

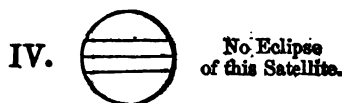
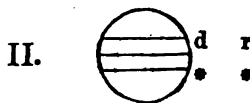
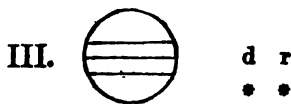


## MEAN TIME.

## JANUARY.

Day.	h m s	Day.	h m s	Day.	h m s
21	I. Oc. D.* 10 43 I. Ec. R. 14 11 44.2	24	I. Oc. D. 23 39	28	I. Oc. D.† 12 37 I. Ec. R. 16 7 44.8
22	III. Oc. D.* 7 35 II. Oc. D.* 7 44 I. Tr. I.* 7 55 I. Sh. I.* 9 15 III. Oc. R.* 9 50 II. Oc. R.* 10 8 I. Tr. E.* 10 8 II. Ec. D.* 10 23 59.2 I. Sh. E.* 11 27 II. Ec. R.* 12 40 57.4 III. Ec. D.† 13 9 44.8 III. Ec. R. 14 57 21.3	25	I. Ec. R. 3 9 43.2 I. Tr. I. 20 52 II. Oc. D. 21 1 III. Tr. I. 21 40 I. Sh. I. 22 13 I. Tr. E. 23 5 II. Oc. R. 23 25 II. Ec. D. 23 41 52.2 III. Tr. E. 23 55	29	I. Tr. I.* 9 50 II. Oc. D.* 10 18 I. Sh. I.* 11 10 III. Oc. D.* 11 33 I. Tr. E.* 12 2 II. Oc. R.† 12 42 II. Ec. D.† 12 59 44.4 I. Sh. E.† 13 23 III. Oc. R. 13 49 II. Ec. R. 15 16 56.2 III. Ec. D. 17 12 26.8 III. Ec. R. 19 0 16.1
23	I. Oc. D.† 5 11 I. Ec. R.* 8 40 39.8	26	I. Sh. E. 0 25 II. Ec. R. 1 58 57.1 III. Sh. I. 3 9 III. Sh. E.† 5 12 I. Oc. D. 18 8 I. Ec. R. 21 38 41.0	30	I. Oc. D.* 7 6 I. Ec. R.* 10 36 40.6
24	I. Tr. I. 2 24 II. Tr. I. 2 30 I. Sh. I. 3 44 I. Tr. E.† 4 36 II. Tr. E.† 4 53 II. Sh. I.† 5 7 I. Sh. E.* 5 56 II. Sh. E.* 7 30	27	I. Tr. I. 15 21 II. Tr. I. 15 48 I. Sh. I. 16 42 I. Tr. E. 17 34 II. Tr. E. 18 11 II. Sh. I. 18 26 I. Sh. E. 18 54 II. Sh. E. 20 49	31	I. Tr. I. 4 18 II. Tr. I.† 5 7 I. Sh. I.† 5 39 I. Tr. E.* 6 31 II. Tr. E.* 7 31 II. Sh. I.* 7 46 I. Sh. E.* 7 51 II. Sh. E.* 10 9

Phases of the Eclipses of the Satellites for an inverting Telescope.



The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## FEBRUARY.

Day.		h m s	Day.		h m s	Day.		h m s
1	I. Oc. D.	1 35	7	II. Sh. I. *	10 25	14	I. Sh. E. †	11 42
	I. Ec. R. †	5 54 3.6		II. Sh. E. †	12 48		II. Tr. E.	12 52
	I. Tr. I.	22 47	8	I. Oc. D.	3 31		II. Sh. I.	13 4
	II. Oc. D.	23 36		I. Ec. R. *	7 14 3.3		II. Sh. E.	15 27
2	I. Sh. I.	0 8	9	I. Tr. I.	0 43	15	I. Oc. D. †	5 29
	I. Tr. E.	1 0		I. Sh. I.	2 3		I. Ec. R. *	8 57 41.0
	III. Tr. I.	1 38		II. Oc. D.	2 12	16	I. Tr. I.	2 40
	II. Oc. R.	2 0		I. Tr. E.	2 56		I. Sh. I.	3 59
	II. Ec. D.	2 17 38.3		I. Sh. E.	4 16		II. Oc. D.	4 51
	I. Sh. E.	2 20		II. Oc. R.	4 37		I. Tr. E.	4 53
	III. Tr. E.	3 56		II. Ec. D.	4 53 27.1		I. Sh. E. *	6 11
	II. Ec. R.	4 34 57.4		III. Tr. I. †	5 42		II. Oc. R. *	7 16
	III. Sh. I. *	7 10		II. Ec. R. *	7 11 1.6		II. Ec. D. *	7 29 18.6
	III. Sh. E. *	9 14		III. Tr. E. *	8 0		II. Ec. R. *	9 47 9.4
	I. Oc. D.	20 4		III. Sh. I. *	11 11		III. Tr. I. *	9 49
	I. Ec. R.	23 34 41.4		III. Sh. E.	13 15		III. Tr. E. †	12 9
3	I. Tr. I.	17 16		I. Oc. D.	22 1		III. Sh. I.	15 13
	II. Tr. I.	18 26	10	I. Ec. R.	1 30 40.5		III. Sh. E.	17 17
	I. Sh. I.	18 37		I. Tr. I.	19 12		I. Oc. D.	23 58
	I. Tr. E.	19 29		I. Sh. I.	20 32	17	I. Ec. R.	3 26 37.7
	I. Sh. E.	20 49		II. Tr. I.	21 6		I. Tr. I.	21 10
	II. Tr. E.	20 50		I. Tr. E.	21 25		I. Sh. I.	22 28
	II. Sh. I.	21 5		I. Sh. E.	22 45		I. Tr. E.	23 23
	II. Sh. E.	23 28		II. Tr. E.	23 31		II. Tr. I.	23 48
4	I. Oc. D.	14 33		II. Sh. I.	23 44	18	I. Sh. E.	0 40
	I. Ec. R.	18 34 5.0	11	II. Sh. E.	2 7		II. Tr. E.	2 13
5	I. Tr. I. *	11 45		I. Oc. D.	16 30		II. Sh. I.	2 22
	II. Oc. D. †	12 54		I. Ec. R.	19 59 43.8		II. Sh. E.	4 46
	I. Sh. I.	13 6	12	I. Tr. I.	13 42		I. Oc. D.	18 28
	I. Tr. E.	13 58		I. Sh. I.	15 1		I. Ec. R.	21 55 40.4
	I. Sh. E.	15 18		II. Oc. D.	15 31	19	I. Tr. I.	15 39
	II. Oc. R.	15 18		I. Tr. E.	15 55		I. Sh. I.	16 57
	III. Oc. D.	15 35		I. Sh. E.	17 13		I. Tr. E.	17 52
	II. Ec. D.	15 35 31.5		II. Oc. R.	17 56		II. Oc. D.	18 11
	II. Ec. R.	17 52 58.2		II. Ec. D.	18 11 21.6		I. Sh. E.	19 9
	III. Oc. R.	17 53		III. Oc. D.	19 41		II. Oc. R.	20 37
	III. Ec. D.	21 14 34.5		II. Ec. R.	20 29 4.1		II. Ec. D.	20 47 14.3
	III. Ec. R.	23 2 39.0		III. Oc. R.	22 1		II. Ec. R.	23 5 13.5
6	I. Oc. D. *	9 2	13	III. Ec. D.	1 16 48.4		III. Oc. D.	23 51
	I. Ec. R. †	12 32 40.6		III. Ec. R.	3 5 10.5	20	III. Oc. R.	2 11
7	I. Tr. I. *	6 14		I. Oc. D. *	10 59		III. Ec. D.	5 18 28.7
	I. Sh. I. *	7 35		I. Ec. R.	14 28 38.9		III. Ec. R. *	7 7 10.6
	II. Tr. I. *	7 46	14	I. Tr. I. *	8 11		I. Oc. D.	12 57
	I. Tr. E. *	8 27		I. Sh. I. *	9 30		I. Ec. R.	16 24 34.8
	I. Sh. E. *	9 47		I. Tr. E. *	10 24	21	I. Tr. I. *	10 9
	II. Tr. E. *	10 11		II. Tr. I. *	10 27		I. Sh. I. †	11 25

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.



## MEAN TIME.

## FEBRUARY.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
21	I. Tr. E.	12	22		23	III. Sh. I.	19	15		26	I. Sh. E.	21	4	
	II. Tr. I.	13	10			III. Sh. E.	21	20			II. Oc. R.	23	18	
	I. Sh. E.	13	38			I. Oc. D.	1	57			II. Ec. D.	23	23	10.8
	II. Tr. E.	15	35		24	I. Ec. R.	5	22	31.9	27	II. Ec. R.	1	41	27.4
	II. Sh. I.	15	42			I. Tr. I.	23	8			III. Oc. D.	4	4	
	II. Sh. E.	18	6			I. Sh. I.	0	23			III. Oc. R.*	6	25	
22	I. Oc. D.*	7	27		25	I. Tr. E.	1	21			III. Ec. D.*	9	20	0.1
	I. Ec. R.*	10	53	36.1		II. Tr. I.	2	31			III. Ec. R.†	11	9	4.1
23	I. Tr. I.	4	38			I. Sh. E.	2	35			I. Oc. D.	14	56	
	I. Sh. I.†	5	54			II. Tr. E.	4	57			I. Ec. R.	18	20	27.3
	I. Tr. E.*	6	51			II. Sh. I.	5	1		28	I. Tr. I.	12	7	
	II. Oc. D.*	7	32			II. Sh. E.*	7	24			I. Sh. I.	13	21	
	I. Sh. E.*	8	6			I. Oc. D.	20	26			I. Tr. E.	14	20	
	II. Oc. R.*	9	57			I. Ec. R.	23	51	33.6		I. Sh. E.	15	33	
	II. Ec. D.*	10	5	12.8	26	I. Tr. I.	17	37			II. Tr. I.	15	54	
	II. Ec. R.	12	23	20.7		I. Sh. I.	18	52			II. Tr. E.	18	20	
	III. Tr. I.	14	1			I. Tr. E.	19	50			II. Sh. I.	18	20	
	III. Tr. E.	16	22			II. Oc. D.	20	53			II. Sh. E.	20	44	

## Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

r  
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III.

d r  
• •

II.

d r  
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IV.

No Eclipse  
of this Satellite.

## MARCH.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
1	I. Oc. D.*	9	26		2	III. Tr. I.	18	16		4	I. Sh. E.	4	31	
	I. Ec. R.	12	49	27.5		III. Tr. E.	20	37			II. Tr. I.	5	16	
2	I. Tr. I.*	6	37			III. Sh. I.	23	17			II. Sh. I.*	7	39	
	I. Sh. I.*	7	49			III. Sh. E.	1	21			II. Tr. E.*	7	42	
	I. Tr. E.*	8	50		3	I. Oc. D.	3	56			II. Sh. E.*	10	3	
	I. Sh. E.*	10	2			I. Ec. R.*	7	18	22.4		I. Oc. D.	22	26	
	II. Oc. D.*	10	14		4	I. Tr. I.	1	6		5	I. Ec. R.	1	47	23.1
	II. Oc. R.	12	40			I. Sh. I.	2	18			I. Tr. I.	19	36	
	II. Ec. D.	12	41	10.3		I. Tr. E.	3	20			I. Sh. I.	20	47	
	II. Ec. R.	14	59	35.8							I. Tr. E.	21	49	

The abbreviations denote as follows :—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## MARCH.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
5	I. Sh. E.	23	0		13	II. Oc. D.	2	20		20	III. Oc. D.	17	3	
	II. Oc. D.	23	36			II. Ec. R. *	6	54	7.7		III. Oc. R.	19	25	
6	II. Ec. R.	4	17	45.2		III. Oc. D.	12	41			I. Oc. D.	20	56	
	III. Oc. D. *	8	21			III. Oc. R.	15	2			III. Ec. D.	21	25	29.4
	III. Oc. R. ↑	10	42			III. Ec. D.	17	23	19.4		III. Ec. R.	23	15	53.8
	III. Ec. D.	13	21	40.8		I. Oc. D.	18	56		21	I. Ec. R.	0	7	38.6
	III. Ec. R.	15	11	9.5		III. Ec. R.	19	13	14.9		I. Tr. I.	18	6	
	I. Oc. D.	16	56			I. Ec. R.	22	11	59.7		I. Sh. I.	19	6	
	I. Ec. R.	20	16	15.9	14	I. Tr. I.	16	6			I. Tr. E.	20	19	
7	I. Tr. I.	14	6			I. Sh. I.	17	11			I. Sh. E.	21	19	
	I. Sh. I.	15	16			I. Tr. E.	18	19		22	II. Tr. I.	0	14	
	I. Tr. E.	16	19			I. Sh. E.	19	24			II. Sh. I.	2	15	
	I. Sh. E.	17	28			II. Tr. I.	21	27			II. Tr. E.	2	41	
	II. Tr. I.	18	40			II. Sh. I.	23	37			II. Sh. E.	4	39	
	II. Sh. I.	20	59			II. Tr. E.	23	53			I. Oc. D.	15	26	
	II. Tr. E.	21	6		15	II. Sh. E.	2	1			I. Ec. R.	18	36	34.7
	II. Sh. E.	23	23			I. Oc. D.	13	26		23	I. Tr. I.	12	36	
8	I. Oc. D.	11	26			I. Ec. R.	16	40	57.2		I. Sh. I.	13	35	
	I. Ec. R.	14	45	14.7	16	I. Tr. I. ↑	10	36			I. Tr. E.	14	49	
9	I. Tr. I. *	8	36			I. Sh. I.	11	40			I. Sh. E.	15	48	
	I. Sh. I. *	9	45			I. Tr. E.	12	49			II. Oc. D.	18	29	
	I. Tr. E. ↑	10	49			I. Sh. E.	13	52			II. Ec. R.	22	48	48.0
	I. Sh. E.	11	57			II. Oc. D.	15	43		24	III. Tr. I. *	7	17	
	II. Oc. D.	12	58			II. Ec. R.	20	12	19.0		III. Tr. E. ↑	9	38	
	II. Ec. R.	17	35	55.1	17	III. Tr. I.	2	54			I. Oc. D. ↑	9	57	
	III. Tr. I.	22	34			III. Tr. E.	5	16			III. Sh. I.	11	20	
10	III. Tr. E.	0	56			III. Sh. I. *	7	19			I. Ec. R.	13	5	26.0
	III. Sh. I.	3	18			I. Oc. D. *	7	56			III. Sh. E.	13	26	
	III. Sh. E.	5	23			III. Sh. E. *	9	25		25	I. Tr. I. ↑	7	6	
	I. Oc. D. ↑	5	56			I. Ec. R.	11	9	49.8		I. Sh. I. *	8	4	
	I. Ec. R. *	9	14	8.5	18	I. Tr. I.	5	6			I. Tr. E. *	9	19	
11	I. Tr. I.	3	6			I. Sh. I. ↑	6	9			I. Sh. E. ↑	10	16	
	I. Sh. I.	4	14			I. Tr. E. *	7	19			II. Tr. I.	13	38	
	I. Tr. E.	5	19			I. Sh. E. *	8	21			II. Sh. I.	15	33	
	I. Sh. E. ↑	6	26			II. Tr. I. ↑	10	50			II. Tr. E.	16	5	
	II. Tr. I. *	8	3			II. Sh. I.	12	55			II. Sh. E.	17	58	
	II. Sh. I. ↑	10	18			II. Tr. E.	13	17		26	I. Oc. D.	4	27	
	II. Tr. E. ↑	10	29			II. Sh. E.	15	20			I. Ec. R. *	7	34	22.0
	II. Sh. E.	12	42		19	I. Oc. D.	2	26		27	I. Tr. I.	1	36	
12	I. Oc. D.	0	26			I. Ec. R.	5	38	48.0		I. Sh. I.	2	33	
	I. Ec. R.	3	43	8.0	20	I. Tr. I.	23	36			I. Tr. E.	3	50	
	I. Tr. I.	21	36			I. Sh. I.	0	38			I. Sh. E.	4	45	
	I. Sh. I.	22	42			I. Tr. E.	1	49			II. Oc. D. *	7	53	
	I. Tr. E.	23	49			I. Sh. E.	2	50			II. Ec. R.	12	7	7.0
13	I. Sh. E.	0	55			II. Oc. D.	5	6			III. Oc. D.	21	28	
						II. Ec. R. *	9	30	35.2		I. Oc. D.	22	57	

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



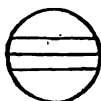
## MEAN TIME.

## MARCH.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
27	III. Oc. R.	23	49		29	II. Sh. I.	4	52		30	II. Oc. D.	21	17	
28	III. Ec. D.	1	26	59.8		II. Tr. E.	5	30		31	II. Ec. R.	1	25	31.8
	I. Ec. R.	2	3	12.0		II. Sh. E.*	7	17			III. Tr. I.	11	42	
	III. Ec. R.	3	17	55.1		I. Oc. D.	17	27			I. Oc. D.	11	58	
	I. Tr. I.	20	7			I. Ec. R.	20	32	6.5		III. Tr. E.	14	3	
	I. Sh. I.	21	2		30	I. Tr. I.	14	37			I. Ec. R.	15	0	56.4
	I. Tr. E.	22	20			I. Sh. I.	15	31			III. Sh. I.	15	21	
	I. Sh. E.	23	14			I. Tr. E.	16	50			III. Sh. E.	17	27	
29	II. Tr. I.	3	3			I. Sh. E.	17	43						

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

r  
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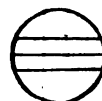
III.

d  
• •

II.

r  
•

IV.

No Eclipse  
of this Satellite.

## APRIL.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
1	I. Tr. I. *	9	7		4	I. Ec. R.	3	58	39.4	7	II. Oc. D.	0	5	
	I. Sh. I. †	9	59			III. Oc. R.	4	15			II. Ec. R.	4	2	0.4
	I. Tr. E.	11	20			III. Ec. D.	5	28	30.7		I. Oc. D.	13	59	
	I. Sh. E.	12	12			III. Ec. R. †	7	19	59.2		III. Tr. I.	16	8	
	II. Tr. I.	16	27			I. Tr. I.	22	8			I. Ec. R.	16	56	20.7
	II. Sh. I.	18	11			I. Sh. I.	22	57			III. Tr. E.	18	29	
	II. Tr. E.	18	54		5	I. Tr. E.	0	21			III. Sh. I.	19	23	
	II. Sh. E.	20	36			I. Sh. E.	1	9			III. Sh. E.	21	29	
2	I. Oc. D.	6	28			II. Tr. I.	5	52		8	I. Tr. I.	11	8	
	I. Ec. R. †	9	29	51.6		II. Sh. I. *	7	30			I. Sh. I.	11	54	
3	I. Tr. I.	3	37			II. Tr. E. *	8	20			I. Tr. E.	13	22	
	I. Sh. I.	4	28			II. Sh. E. †	9	55			I. Sh. E.	14	7	
	I. Tr. E.	5	51			I. Oc. D.	19	29			II. Tr. I.	19	17	
	I. Sh. E. †	6	41			I. Ec. R.	22	27	32.2		II. Sh. I.	20	48	
	II. Oc. D.	10	41		6	I. Tr. I.	16	38			II. Tr. E.	21	44	
	II. Ec. R.	14	43	45.4		I. Sh. I.	17	26			II. Sh. E.	23	13	
4	I. Oc. D.	0	59			I. Tr. E.	18	51		9	I. Oc. D. *	8	30	
	III. Oc. D.	1	53			I. Sh. E.	19	38			I. Ec. R.	11	25	14.2

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## APRIL.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
10	I. Tr. I.	5	39		17	I. Tr. I. †	7	40		24	I. Tr. I.	9	42	
	I. Sh. I.	6	23			I. Sh. I. *	8	18			I. Sh. I.	10	13	
	I. Tr. E. *	7	52			I. Tr. E.	9	54			I. Tr. E.	11	56	
	I. Sh. E. *	8	36			I. Sh. E.	10	31			I. Sh. E.	12	26	
	II. Oc. D.	13	29			II. Oc. D.	16	19			II. Oc. D.	19	9	
	II. Ec. R.	17	20	28.4		II. Ec. R.	19	57	16.5		II. Ec. R.	22	34	9.7
11	I. Oc. D.	3	0		18	I. Oc. D.	5	2		25	I. Oc. D.	7	4	
	I. Ec. R.	5	54	0.6		I. Ec. R. †	7	49	15.0		I. Ec. R.	9	44	22.7
	III. Oc. D.	6	21			III. Oc. D.	10	49			III. Oc. D.	15	18	
	III. Oc. R. *	8	42			III. Oc. R.	13	10			III. Ec. R.	19	24	22.7
	III. Ec. D. †	9	29	26.1		III. Ec. D.	13	30	10.3					
	III. Ec. R.	11	21	29.6		III. Ec. R.	15	22	50.6	26	I. Tr. I.	4	13	
12	I. Tr. I.	0	9		19	I. Tr. I.	2	11			I. Sh. I.	4	42	
	I. Sh. I.	0	52			I. Sh. I.	2	47			I. Tr. E.	6	26	
	I. Tr. E.	2	23			I. Tr. E.	4	24			I. Sh. E.	6	55	
	I. Sh. E.	3	5			I. Sh. E.	5	0			II. Tr. I.	14	23	
	II. Tr. I. *	8	42			II. Tr. I.	11	32			II. Sh. I.	15	21	
	II. Sh. I.	10	7			II. Sh. I.	12	44			II. Tr. E.	16	51	
	II. Tr. E.	11	10			II. Tr. E.	14	0			II. Sh. E.	17	47	
	II. Sh. E.	12	32			II. Sh. E.	15	10		27	I. Oc. D.	1	35	
	I. Oc. D.	21	31			I. Oc. D.	23	32			I. Ec. R.	4	13	9.9
13	I. Ec. R.	0	22	51.5	20	I. Ec. R.	2	18	4.1		I. Tr. I.	22	43	
	I. Tr. I.	18	40			I. Tr. I.	20	41			I. Sh. I.	23	11	
	I. Sh. I.	19	21			I. Sh. I.	21	16		28	I. Tr. E.	0	57	
	I. Tr. E.	20	53			I. Tr. E.	22	55			I. Sh. E.	1	23	
	I. Sh. E.	21	33			I. Sh. E.	23	29			II. Oc. D. †	8	34	
14	II. Oc. D.	2	54		21	II. Oc. D.	5	44			II. Ec. R.	11	52	26.7
	II. Ec. R.	6	38	44.0		II. Ec. R. †	9	15	32.8		I. Oc. D.	20	5	
	I. Oc. D.	16	1			I. Oc. D.	18	3			I. Ec. R.	22	41	53.5
	I. Ec. R.	18	51	38.3		I. Ec. R.	20	46	49.3	29	III. Tr. I.	5	35	
	III. Tr. I.	20	37		22	III. Tr. I.	1	5			III. Sh. I. †	7	26	
	III. Tr. E.	22	58			III. Sh. I.	3	25			III. Tr. E. †	7	56	
	III. Sh. I.	23	24			III. Tr. E.	3	26			III. Sh. E.	9	34	
15	III. Sh. E.	1	31			III. Sh. E.	5	32			I. Tr. I.	17	14	
	I. Tr. I.	13	10			I. Tr. I.	15	12			I. Sh. I.	17	40	
	I. Sh. I.	13	50			I. Sh. I.	15	45			I. Tr. E.	19	27	
	I. Tr. E.	15	23			I. Tr. E.	17	25			I. Sh. E.	19	52	
	I. Sh. E.	16	2			I. Sh. E.	17	57		30	II. Tr. I.	3	48	
	II. Tr. I.	22	7								II. Sh. I.	4	39	
	II. Sh. I.	23	25		23	II. Tr. I.	0	57			II. Tr. E.	6	16	
16	II. Tr. E.	0	34			II. Sh. I.	2	2			II. Sh. E.	7	5	
	II. Sh. E.	1	51			II. Tr. E.	3	25			I. Oc. D.	14	36	
	I. Oc. D.	10	32			II. Sh. E.	4	28			I. Ec. R.	17	10	41.6
	I. Ec. R.	13	20	30.1		I. Oc. D.	12	34						
						I. Ec. R.	15	15	39.3					

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## APRIL.

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.



III.



II.



IV.

No Eclipse.  
of this Satellite.

## THE SATELLITES OF JUPITER

ARE INVISIBLE FROM APRIL 30 UNTIL JUNE 20,

JUPITER BEING TOO NEAR TO THE SUN.

## JUNE.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
20	I. Sh. I.	1	32		23	I. Tr. E.	17	13		27	I. Tr. E.	6	13	
	I. Tr. I.	1	58			II. Ec. D.	6	25	41.2		II. Ec. D.	19	44	40.6
	I. Sh. E.	3	45		24	II. Oc. R.	9	57			II. Oc. R.	23	23	
	I. Tr. E.	4	12			I. Ec. D.	11	50	7.0	28	I. Ec. D.	0	47	9.6
	II. Ec. D.	17	7	38.0		I. Oc. R.†	14	32			I. Oc. R.	3	33	
	II. Oc. R.	20	32		25	I. Sh. I.	8	57			I. Sh. I.	21	55	
	I. Ec. D.	22	53	5.2		I. Tr. I.	9	29			I. Tr. I.	22	30	
21	I. Oc. R.	1	32			I. Sh. E.	11	11		29	I. Sh. E.	0	8	
	I. Sh. I.	20	0			I. Tr. E.	11	43			I. Tr. E.	0	44	
	I. Tr. I.	20	29		III. Sh. I.†	15	29			III. Ec. D.	5	34	24.7	
	I. Sh. E.	22	13		III. Tr. I.	17	36			III. Ec. R.	7	34	43.0	
	I. Tr. E.	22	42		III. Sh. E.	17	42			III. Oc. D.	7	49		
22	III. Ec. D.	1	34	0.9	III. Tr. E.	19	57			III. Oc. R.	10	10		
	III. Oc. R.	5	41		26	II. Sh. I.	1	24			II. Sh. I.†	14	41	
	II. Sh. I.	12	6			II. Tr. I.	2	29			II. Tr. I.	15	53	
	II. Tr. I.	13	5			II. Sh. E.	3	53			II. Sh. E.	17	10	
	II. Sh. E.†	14	35			II. Tr. E.	5	1			II. Tr. E.	18	25	
	II. Tr. E.†	15	36			I. Ec. D.	6	18	40.0		I. Ec. D.	19	15	39.8
	I. Ec. D.	17	21	37.1		I. Oc. R.	9	3			I. Oc. R.	22	3	
	I. Oc. R.	20	2		27	I. Sh. I.	3	26		30	I. Sh. I.	16	23	
23	I. Sh. I.†	14	29			I. Tr. I.	4	0			I. Tr. I.	17	0	
	I. Tr. I.†	14	59			I. Sh. E.	5	39			I. Sh. E.	18	37	
	I. Sh. E.	16	42								I. Tr. E.	19	14	

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## JUNE.

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.



III.



II.



IV.

No Eclipse  
of this Satellite.

## JULY.

Day.		h m s	Day.		h m s	Day.		h m s
1	II. Ec. D.	9 2 43.1	6	I. Tr. E.	2 45	10	I. Ec. D.	10 6 33.3
	II. Oc. R.	12 49		III. Ec. D.	9 34 6.7		II. Tr. E.	10 38
	I. Ec. D.	13 44 8.2		III. Ec. R.	11 35 18.5		I. Oc. R.	13 4
	I. Oc. R.	16 33		III. Oc. D.	12 16	11	I. Sh. I.	7 15
2	I. Sh. I.	10 52		III. Oc. R.	14 38		I. Tr. I.	8 2
	I. Tr. I.	11 31		II. Sh. I.	17 16		I. Sh. E.	9 29
	I. Sh. E.	13 5		II. Tr. I.	18 42		I. Tr. E.	10 16
	I. Tr. E.	13 44		II. Sh. E.	19 45	12	II. Ec. D.	0 58 49.5
	III. Sh. I.	19 29		I. Ec. D.	21 9 36.6		I. Ec. D.	4 35 0.5
	III. Sh. E.	21 43		II. Tr. E.	21 14		II. Oc. R.	5 5
	III. Tr. I.	22 4	7	I. Oc. R.	0 3		I. Oc. R.	7 34
3	III. Tr. E.	0 25		I. Sh. I.	18 18	13	I. Sh. I.	1 44
	II. Sh. I.	3 58		I. Tr. I.	19 1		I. Tr. I.	2 32
	II. Tr. I.	5 17		I. Sh. E.	20 31		I. Sh. E.	3 57
	II. Sh. E.	6 27		I. Tr. E.	21 15		I. Tr. E.	4 46
	II. Tr. E.	7 50		II. Ec. D.	11 39 46.4		III. Ec. D.	13 33 46.0
	I. Ec. D.	8 12 39.6	8	I. Ec. D.	15 38 3.6		III. Ec. R.	15 35 52.5
	I. Oc. R.	11 3		II. Oc. R.	15 40		III. Oc. D.	16 41
4	I. Sh. I.	5 21		I. Oc. R.	18 34		III. Oc. R.	19 3
	I. Tr. I.	6 1	9	I. Sh. I.	12 47		II. Sh. I.	19 50
	I. Sh. E.	7 34		I. Tr. I.	13 32		II. Tr. I.	21 29
	I. Tr. E.	8 15		I. Sh. E.	15 0		II. Sh. E.	22 20
	II. Ec. D.	22 21 44.4		I. Tr. E.	15 45		I. Ec. D.	23 3 27.5
5	II. Oc. R.	2 14		III. Sh. I.	23 29	14	II. Tr. E.	0 1
	I. Ec. D.	2 41 7.9	10	III. Sh. E.	1 44		I. Oc. R.	2 4
	I. Oc. R.	5 33		III. Tr. I.	2 30		I. Sh. I.	20 12
	I. Sh. I.	23 49		III. Tr. E.	4 52		I. Tr. I.	21 2
6	I. Tr. I.	0 31		II. Sh. I.	6 33		I. Sh. E.	22 26
	I. Sh. E.	2 3		II. Tr. I.	8 5		I. Tr. E.	23 16
				II. Sh. E.	9 2			

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## JULY.

Day.		h m s	Day.		h m s	Day.		h m s
15	II. Ec. D.	†14 16 50.3	21	II. Tr. I.	0 15	27	I. Sh. I.	5 32
	I. Ec. D.	17 31 53.4		II. Sh. E.	0 54		I. Tr. I.	6 32
	II. Oc. R.	18 30		I. Ec. D.	0 57 13.2		I. Sh. E.	7 46
	I. Oc. R.	20 34		II. Tr. E.	2 48		I. Tr. E.	8 46
16	I. Sh. I.	*14 41		I. Oc. R.	4 3		III. Ec. D.	21 31 54.4
	I. Tr. I.	†15 32		I. Sh. I.	22 7		III. Ec. R.	23 35 53.8
	I. Sh. E.	16 54		I. Tr. I.	23 2	28	II. Sh. I.	0 58
	I. Tr. E.	17 46	22	I. Sh. E.	0 20		III. Oc. D.	1 27
17	III. Sh. I.	3 29		I. Tr. E.	1 16		I. Ec. D.	2 50 53.7
	III. Sh. E.	5 44		II. Ec. D.	16 53 54.1		II. Tr. I.	3 0
	III. Tr. I.	6 55		I. Ec. D.	19 25 37.7		II. Sh. E.	3 29
	II. Sh. I.	9 7		II. Oc. R.	21 19		III. Oc. R.	3 49
	III. Tr. E.	9 17		I. Oc. R.	22 33		II. Tr. E.	5 34
	II. Tr. I.	10 52	23	I. Sh. I.	16 35		I. Oc. R.	6 3
	II. Sh. E.	11 37		I. Tr. I.	17 32	29	I. Sh. I.	0 1
	I. Ec. D.	12 0 21.4		I. Sh. E.	18 49		I. Tr. I.	1 2
	II. Tr. E.	†13 25		I. Tr. E.	19 46		I. Sh. E.	2 15
	I. Oc. R.	†15 3	24	III. Sh. I.	7 29		I. Tr. E.	3 16
18	I. Sh. I.	9 10		III. Sh. E.	9 45		II. Ec. D.	19 30 57.4
	I. Tr. I.	10 2		III. Tr. I.	11 19		I. Ec. D.	21 19 17.2
	I. Sh. E.	11 23		II. Sh. I.	11 41	30	II. Oc. R.	0 7
	I. Tr. E.	12 16		II. Tr. I.	†13 38		I. Oc. R.	0 32
19	II. Ec. D.	3 35 54.3		III. Tr. E.	†13 41		I. Sh. I.	18 30
	I. Ec. D.	6 28 47.6		I. Ec. D.	*13 54 4.3		I. Tr. I.	19 32
	II. Oc. R.	7 54		II. Sh. E.	*14 12		I. Sh. E.	20 43
	I. Oc. R.	9 33		II. Tr. E.	†16 11		I. Tr. E.	21 46
20	I. Sh. I.	3 38		I. Oc. R.	17 3	31	III. Sh. I.	11 29
	I. Tr. I.	4 32	25	I. Sh. I.	11 4		III. Sh. E.	*13 46
	I. Sh. E.	5 52		I. Tr. I.	12 2		II. Sh. I.	*14 16
	I. Tr. E.	6 46		I. Sh. E.	†13 17		III. Tr. I.	†15 40
	III. Ec. D.	17 32 53.9		I. Tr. E.	*14 16		I. Ec. D.	†15 47 42.6
	III. Ec. R.	19 35 56.2	26	II. Ec. D.	6 12 58.4		II. Tr. I.	†16 23
	III. Oc. D.	21 5		I. Ec. D.	8 22 29.5		II. Sh. E.	16 46
	II. Sh. I.	22 24		II. Oc. R.	10 43		III. Tr. E.	18 3
	III. Oc. R.	23 27		I. Oc. R.	11 33		II. Tr. E.	18 56
							I. Oc. R.	19 2

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress, E. Egress.



## MEAN TIME.

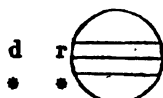
JULY.

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.



III.



II.



IV.

No Eclipse  
of this Satellite.

## AUGUST.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
1	I. Sh. I.	†12	58		6	II. Oc. R.	2	55		11	I. Ec. D.	6	38	2.2
	I. Tr. I.	*14	1			I. Sh. I.	20	24			III. Ec. R.	7	36	18.1
	I. Sh. E.	*15	12			I. Tr. I.	21	31			II. Tr. I.	8	28	
	I. Tr. E.	†16	15			I. Sh. E.	22	37			II. Sh. E.	8	37	
2	II. Ec. D.	8	50	1.7		I. Tr. E.	23	45			I. Oc. R.	9	59	
	I. Ec. D.	10	16	6.8	7	III. Sh. I.	*15	28			III. Oc. R.	10	4	
	II. Oc. R.	*13	31			II. Sh. I.	16	49			II. Tr. E.	11	2	
	I. Oc. R.	*13	31			I. Ec. D.	17	41	16.5		III. Oc. R.	†12	28	
3	I. Sh. I.	7	27			III. Sh. E.	17	46		12	I. Sh. I.	3	49	
	I. Tr. I.	8	31			II. Tr. I.	19	6			I. Tr. I.	4	59	
	I. Sh. E.	9	40			II. Sh. E.	19	20			I. Sh. E.	6	3	
	I. Tr. E.	10	45			III. Tr. I.	19	59			I. Tr. E.	7	13	
4	III. Ec. D.	1	31	10.5		I. Oc. R.	21	0		13	II. Ec. D.	0	44	58.5
	II. Sh. I.	3	33			II. Tr. E.	21	40			I. Ec. D.	1	6	24.0
	III. Ec. R.	3	36	7.9	8	III. Tr. E.	22	23			I. Oc. R.	4	28	
	I. Ec. D.	4	44	29.9		I. Sh. I.	*14	52			II. Oc. R.	5	41	
	II. Tr. I.	5	45			I. Tr. I.	†16	0			I. Sh. I.	22	18	
	III. Oc. D.	5	46			I. Sh. E.	17	6			I. Tr. I.	23	29	
	II. Sh. E.	6	3			I. Tr. E.	18	14		14	I. Sh. E.	0	32	
	I. Oc. R.	8	1		9	II. Ec. D.	11	27	2.7		I. Tr. E.	1	43	
	III. Oc. R.	8	10			I. Ec. D.	†12	9	40.1		II. Sh. I.	19	24	
	II. Tr. E.	8	18			I. Oc. R.	*15	30			III. Sh. I.	19	27	
5	I. Sh. I.	1	55			II. Oc. R.	†16	18			I. Ec. D.	19	34	47.1
	I. Tr. I.	3	1		10	I. Sh. I.	9	21			III. Sh. E.	21	46	
	I. Sh. E.	4	9			I. Tr. I.	10	29			II. Tr. I.	21	49	
	I. Tr. E.	5	15			I. Sh. E.	11	34			II. Sh. E.	21	55	
	II. Ec. D.	22	7	59.0		I. Tr. E.	†12	44			I. Oc. R.	22	58	
	I. Ec. D.	23	12	52.4	11	III. Ec. D.	5	30	21.4	15	III. Tr. I.	0	15	
6	I. Oc. R.	2	31			II. Sh. I.	6	6			II. Tr. E.	0	23	

The abbreviations denote as follows :—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## AUGUST.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
15	III. Tr. E.	2	39		21	I. Tr. E.	3	41		26	I. Sh. E.	9	51	
	I. Sh. I.	†	16	47		I. Ec. D.	21	28	14.8		I. Tr. E.	†	11	9
	I. Tr. I.	17	58			II. Sh. I.	21	57		27	I. Ec. D.	4	53	18.6
	I. Sh. E.	19	0			III. Sh. I.	23	27			II. Ec. D.	5	58	48.5
	I. Tr. E.	20	12		22	II. Sh. E.	0	29			I. Oc. R.	8	22	
16	I. Ec. D.	*14	3	10.0		II. Tr. I.	0	29			II. Ec. R.	8	27	6.6
	II. Ec. D.	*14	4	1.1		I. Oc. R.	0	55			II. Oc. D.	8	34	
	I. Oc. R.	17	27			III. Sh. E.	1	47			II. Oc. R.	†	11	9
	II. Oc. R.	19	4			II. Tr. E.	3	4		28	I. Sh. I.	2	6	
17	I. Sh. I.	11	15			III. Tr. I.	4	28			I. Tr. I.	3	23	
	I. Tr. I.	†	12	28		III. Tr. E.	6	53			I. Sh. E.	4	20	
	I. Sh. E.	*13	29			I. Sh. I.	18	41			I. Tr. E.	5	38	
	I. Tr. E.	*14	42			I. Tr. I.	19	56			I. Ec. D.	23	21	40.0
18	I. Ec. D.	8	31	31.4		I. Sh. E.	20	54		29	II. Sh. I.	0	31	
	II. Sh. I.	8	40			I. Tr. E.	22	10			I. Oc. R.	2	51	
	III. Ec. D.	9	30	4.8	23	I. Ec. D.	*15	56	37.3		II. Sh. E.	3	3	
	II. Tr. I.	11	9			II. Ec. D.	†	16	40	56.1	II. Tr. I.	3	9	
	II. Sh. E.	11	12			II. Ec. R.	19	9	2.4		III. Sh. I.	3	26	
	III. Ec. R.	†	11	37	1.6	II. Oc. D.	19	13			II. Tr. E.	5	44	
	I. Oc. R.	†	11	56		I. Oc. R.	19	24			III. Sh. E.	5	47	
	II. Tr. E.	*13	44			II. Oc. R.	21	48			III. Tr. I.	8	39	
	III. Oc. D.	*14	19		24	I. Sh. I.	*13	9			III. Tr. E.	†	11	4
	III. Oc. R.	†	16	43		I. Tr. I.	*14	25			I. Sh. I.	20	35	
19	I. Sh. I.	5	44			I. Sh. E.	*15	23			I. Tr. I.	21	53	
	I. Tr. I.	6	57			I. Tr. E.	†	16	40		I. Sh. E.	22	49	
	I. Sh. E.	7	57		25	I. Ec. D.	10	24	57.8	30	I. Tr. E.	0	7	
	I. Tr. E.	9	11			II. Sh. I.	†	11	14		I. Ec. D.	17	50	2.3
20	I. Ec. D.	2	59	52.6		III. Ec. D.	*13	29	8.9		II. Ec. D.	19	17	47.0
	II. Ec. D.	3	21	55.4		II. Sh. E.	*13	46			I. Oc. R.	21	20	
	II. Ec. R.	5	49	49.8		II. Tr. I.	*13	49			II. Ec. R.	21	46	16.6
	II. Oc. D.	5	51			I. Oc. R.	*13	53			II. Oc. D.	21	55	
	I. Oc. R.	6	26			III. Ec. R.	*15	37	6.5	31	II. Oc. R.	0	30	
	II. Oc. R.	8	26			II. Tr. E.	†	16	24		I. Sh. I.	*15	3	
21	I. Sh. I.	0	12			III. Oc. D.	18	31			I. Tr. I.	*16	22	
	I. Tr. I.	1	26			III. Oc. R.	20	56			I. Sh. E.	17	17	
	I. Sh. E.	2	26		26	I. Sh. I.	7	38			I. Tr. E.	18	36	
						I. Tr. I.	8	54						

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite. Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## AUGUST.

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

d  
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III.

d r  
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II.

d  
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IV.

No Eclipse  
of this Satellite.

## SEPTEMBER.

Day.	h m s	Day.	h m s	Day.	h m s
1	I. Ec. D. *12 18 22.2	5	III. Sh. I. 7 26	9	I. Sh. I. *11 26
	II. Sh. I. *13 48		II. Tr. E. 8 22		I. Tr. I. *12 46
	I. Oc. R. *15 49		III. Sh. E. 9 47		I. Sh. E. *13 40
	II. Sh. E. *16 20		III. Tr. I. *12 46		I. Tr. E. *15 1
	II. Tr. I. †16 28		III. Tr. E. *15 12	10	I. Ec. D. 8 40 5.6
	III. Ec. D. 17 28 12.4		I. Sh. I. 22 29		II. Ec. D. *11 12 23.1
	II. Tr. E. 19 3		I. Tr. I. 23 48		I. Oc. R. *12 13
	III. Ec. R. 19 37 11.6	6	I. Sh. E. 0 43		II. Ec. R. *13 41 26.8
	III. Oc. D. 22 39		I. Tr. E. 2 3		II. Oc. D. *13 54
2	III. Oc. R. 1 5		I. Ec. D. 19 43 25.7		II. Oc. R. *16 30
	I. Sh. I. 9 32		II. Ec. D. 21 54 33.7	11	I. Sh. I. 5 54
	I. Tr. I. †10 51		I. Oc. R. 23 15		I. Tr. I. 7 15
	I. Sh. E. *11 46	7	II. Ec. R. 0 23 26.1		I. Sh. E. 8 8
	I. Tr. E. *13 5		II. Oc. D. 0 35		I. Tr. E. 9 29
3	I. Ec. D. 6 46 42.6		II. Oc. R. 3 11	12	I. Ec. D. 3 8 26.2
	II. Ec. D. 8 35 38.1		I. Sh. I. †16 57		II. Sh. I. 5 39
	I. Oc. R. 10 18		I. Tr. I. 18 17		I. Oc. R. 6 41
	II. Ec. R. †11 4 19.2		I. Sh. E. 19 11		II. Sh. E. 8 11
	II. Oc. D. †11 15		I. Tr. E. 20 32		II. Tr. I. 8 22
	II. Oc. R. *13 51	8	I. Ec. D. *14 11 45.3		II. Tr. E. †10 58
4	I. Sh. I. 4 0		II. Sh. I. *16 22	13	III. Sh. I. *11 25
	I. Tr. I. 5 20		I. Oc. R. 17 44		III. Sh. E. *13 48
	I. Sh. E. 6 14		II. Sh. E. 18 54		III. Tr. I. †16 50
	I. Tr. E. 7 34		II. Tr. I. 19 4		III. Tr. E. 19 17
5	I. Ec. D. 1 15 3.7		III. Ec. D. 21 26 50.2		I. Sh. I. 0 23
	II. Sh. I. 3 5		II. Tr. E. 21 40		I. Tr. I. 1 43
	I. Oc. R. 4 47		III. Ec. R. 23 36 51.4		I. Sh. E. 2 37
	II. Sh. E. 5 37	9	III. Oc. D. 2 44		I. Tr. E. 3 58
	II. Tr. I. 5 46		III. Oc. R. 5 11		I. Ec. D. 21 36 48.4

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## SEPTEMBER.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
14	II. Ec. D.	0	31	15.5	19	III. Sh. E.	17	48		25	I. Sh. E.	*11	56	
	I. Oc. R.	1	9			III. Tr. I.	20	49			I. Tr. E.	*13	17	
	II. Ec. R.	3	0	30.3		III. Tr. E.	23	17		26	I. Ec. D.	6	55	12.0
	II. Oc. D.	3	13		20	I. Sh. I.	2	17			I. Oc. R.	*10	27	
	II. Oc. R.	5	49			I. Tr. I.	3	37			II. Sh. I.	*10	46	
	I. Sh. I.	18	51			I. Sh. E.	4	31			II. Sh. E.	*13	20	
	I. Tr. I.	20	12			I. Tr. E.	5	52			II. Tr. I.	*13	28	
	I. Sh. E.	21	5			I. Ec. D.	23	30	11.3		II. Tr. E.	*16	4	
	I. Tr. E.	22	26		21	I. Oc. R.	3	3			III. Sh. I.	19	24	
15	I. Ec. D.	*16	5	7.9		II. Ec. D.	3	7	52.1	27	III. Sh. E.	21	49	
	II. Sh. I.	18	56			II. Ec. R.	5	37	29.1		III. Tr. I.	0	45	
	I. Oc. R.	19	38			II. Oc. D.	5	49			III. Tr. E.	3	13	
	II. Sh. E.	21	28			II. Oc. R.	8	26			I. Sh. I.	4	11	
	II. Tr. I.	21	40			I. Sh. I.	20	45			I. Tr. I.	5	30	
16	II. Tr. E.	0	16			I. Tr. I.	22	6			I. Sh. E.	6	25	
	III. Ec. D.	1	25	26.2		I. Sh. E.	22	59			I. Tr. E.	7	45	
	III. Ec. R.	3	36	30.1	22	I. Tr. E.	0	20		28	I. Ec. D.	1	23	35.0
	III. Oc. D.	6	45			I. Ec. D.	17	58	30.8		I. Oc. R.	4	55	
	III. Oc. R.	9	12			II. Sh. I.	21	29			II. Ec. D.	5	44	23.4
	I. Sh. I.	*13	20			I. Oc. R.	21	31			II. Ec. R.	8	14	21.7
	I. Tr. I.	*14	40		23	II. Sh. E.	0	3			II. Oc. D.	8	23	
	I. Sh. E.	*15	34			II. Tr. I.	0	12			II. Oc. R.	*11	0	
	I. Tr. E.	†16	55			II. Tr. E.	2	49			I. Sh. I.	22	39	
17	I. Ec. D.	†10	33	28.4		III. Ec. D.	5	24	23.7	29	I. Tr. I.	23	58	
	II. Ec. D.	*13	49	3.4		III. Ec. R.	7	36	31.2		I. Sh. E.	0	53	
	I. Oc. R.	*14	6			III. Oc. D.	*10	42			I. Tr. E.	2	13	
	II. Ec. R.	*16	18	29.4		III. Oc. R.	*13	10			I. Ec. D.	19	51	54.9
	II. Oc. D.	*16	32			I. Sh. I.	*15	14			I. Oc. R.	23	23	
	II. Oc. R.	19	8			I. Tr. I.	*16	34		30	II. Sh. I.	0	3	
18	I. Sh. I.	7	48			I. Sh. E.	†17	28			II. Sh. E.	2	37	
	I. Tr. I.	9	9			I. Tr. E.	18	49			II. Tr. I.	2	43	
	I. Sh. E.	†10	2								II. Tr. E.	5	20	
	I. Tr. E.	*11	24		24	I. Ec. D.	*12	26	51.7		III. Ec. D.	†9	23	19.8
19	I. Ec. D.	5	1	48.7		I. Oc. R.	*15	59			III. Ec. R.	*11	36	31.5
	II. Sh. I.	8	13			II. Ec. D.	*16	25	38.3		III. Oc. D.	*14	35	
	I. Oc. R.	8	35			II. Ec. R.	18	55	26.0		III. Oc. R.	*17	3	
	II. Sh. E.	*10	46			II. Oc. D.	19	7			I. Sh. I.	*17	8	
	II. Tr. I.	*10	56			II. Oc. R.	21	43			I. Tr. I.	18	26	
	II. Tr. E.	*13	33		25	I. Sh. I.	†9	42			I. Sh. E.	19	22	
	III. Sh. I.	*15	25			I. Tr. I.	*11	2			I. Tr. E.	20	41	

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite. Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## SEPTEMBER.

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

d

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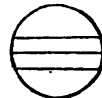
III.

d

r

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II.

d

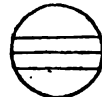
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r

•



IV.

No Eclipse  
of this Satellite.

## OCTOBER.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
1	I. Ec. D.	*14	20	16.3	6	I. Sh. E.	2	47		11	III. Sh. I.	3	22	
	I. Oc. R.	†17	51			I. Tr. E.	4	4			III. Sh. E.	5	48	
	II. Ec. D.	19	2	8.0		I. Ec. D.	21	45	20.9		I. Sh. I.	7	58	
	II. Ec. R.	21	32	17.0		I. Oc. R.	1	14			III. Tr. I.	†	8	21
	II. Oc. D.	21	40		7	II. Sh. I.	2	37			I. Tr. I.	†	9	13
2	II. Oc. R.	0	16			II. Tr. I.	5	12			I. Sh. E.	*10	13	
	I. Sh. I.	*11	36			II. Sh. E.	5	12			III. Tr. E.	*10	49	
	I. Tr. I.	*12	54			II. Tr. E.	7	48			I. Tr. E.	*11	27	
	I. Sh. E.	*13	50			III. Ec. D.	*13	22	52.8	12	I. Ec. D.	5	10	29.0
	I. Tr. E.	*15	9			III. Ec. R.	*15	37	9.3		I. Oc. R.	†	8	36
3	I. Ec. D.	†	8	48	36.8	III. Oc. D.	18	24			II. Ec. D.	*10	57	9.0
	I. Oc. R.	*12	19			I. Sh. I.	19	2			II. Oc. R.	*16	1	
	II. Sh. I.	*13	20			I. Tr. I.	20	18		13	I. Sh. I.	2	27	
	II. Sh. E.	*15	54			III. Oc. R.	20	52			I. Tr. I.	3	40	
	II. Tr. I.	*15	58			I. Sh. E.	21	16			I. Sh. E.	4	41	
	II. Tr. E.	18	34			I. Tr. E.	22	32			I. Tr. E.	5	55	
	III. Sh. I.	23	23		8	I. Ec. D.	*16	13	43.1		I. Ec. D.	23	38	50.2
4	III. Sh. E.	1	48			I. Oc. R.	19	41		14	I. Oc. R.	3	4	
	III. Tr. I.	4	35			II. Ec. D.	21	38	32.4		II. Sh. I.	5	11	
	I. Sh. I.	6	5		9	II. Ec. R.	0	9	2.1		II. Tr. I.	7	38	
	III. Tr. E.	7	3			II. Oc. D.	0	10			II. Sh. E.	7	46	
	I. Tr. I.	7	22			II. Oc. R.	2	46			II. Tr. E.	*10	15	
	I. Sh. E.	8	19			I. Sh. I.	*13	30			III. Ec. D.	*17	21	51.3
	I. Tr. E.	†	9	37		I. Tr. I.	*14	45			III. Ec. R.	19	37	13.2
5	I. Ec. D.	3	17	0.6		I. Sh. E.	*15	44			I. Sh. I.	20	56	
	I. Oc. R.	6	46			I. Tr. E.	*17	0			I. Tr. I.	22	8	
	II. Ec. D.	8	20	48.9	10	I. Ec. D.	*10	42	4.3		III. Oc. D.	22	8	
	II. Ec. R.	*10	51	8.3		I. Oc. R.	*14	9			I. Sh. E.	23	10	
	II. Oc. D.	*10	55			II. Sh. I.	*15	55		15	I. Tr. E.	0	22	
	II. Oc. R.	*13	31			II. Tr. I.	18	26			III. Oc. R.	0	36	
6	I. Sh. I.	0	33			II. Sh. E.	18	29			I. Ec. D.	†18	7	13.3
	I. Tr. I.	1	50			II. Tr. E.	21	2			I. Oc. R.	21	31	

The abbreviations denote as follows :—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## OCTOBER.

Day.	h m s	Day.	h m s	Day.	h m s
16	II. Ec. D. 0 14 51.5	21	II. Tr. E. *12 39	26	II. Ec. D. *16 9 32.8
	II. Oc. R. 5 14		III. Ec. D. 21 20 53.7		II. Oc. R. 20 52
	I. Sh. I. *15 24		I. Sh. I. 22 49	27	I. Sh. I. 6 15
	I. Tr. I. *16 35		III. Ec. R. 23 37 21.3		I. Tr. I. † 7 18
	I. Sh. E. *17 38		I. Tr. I. 23 57		I. Sh. E. * 8 30
	I. Tr. E. 18 50		I. Sh. E. 1 4		I. Tr. E. * 9 32
17	I. Ec. D. *12 35 35.3	22	III. Oc. D. 1 47	28	I. Ec. D. 3 26 1.5
	I. Oc. R. *15 58		I. Tr. E. 2 11		I. Oc. R. 6 40
	II. Sh. I. † 18 29		III. Oc. R. 4 15		II. Sh. I. *10 20
	II. Tr. I. 20 51		I. Ec. D. 20 0 47.8		II. Tr. I. *12 24
	II. Sh. E. 21 3		I. Oc. R. 23 19		II. Sh. E. *12 56
	II. Tr. E. 23 27		II. Ec. D. 2 51 5.4		II. Tr. E. *15 1
18	III. Sh. I. 7 21	23	II. Oc. R. † 7 40	29	I. Sh. I. 0 44
	III. Sh. E. * 9 49		I. Sh. I. *17 18		III. Ec. D. 1 19 37.7
	I. Sh. I. * 9 52		I. Tr. I. † 18 24		I. Tr. I. 1 45
	I. Tr. I. *11 2		I. Sh. E. 19 33		I. Sh. E. 2 58
	III. Tr. I. *12 3		I. Tr. E. 20 38		III. Ec. R. 3 37 11.5
	I. Sh. E. *12 7		I. Ec. D. *14 29 10.6		I. Tr. E. 3 59
	I. Tr. E. *13 17	24	I. Oc. R. *17 46		III. Oc. D. 5 21
	III. Tr. E. *14 31		II. Sh. I. 21 3		III. Oc. R. † 7 49
19	I. Ec. D. 7 4 1.2		II. Tr. I. 23 14		I. Ec. D. 21 54 27.5
	I. Oc. R. *10 25		II. Sh. E. 23 38	30	I. Oc. R. 1 7
	II. Ec. D. *13 33 23.5	25	II. Tr. E. 1 50		II. Ec. D. 5 27 14.3
	II. Oc. R. † 18 27		III. Sh. I. *11 20		II. Oc. R. *10 3
20	I. Sh. I. 4 21		I. Sh. I. *11 46		I. Sh. I. 19 12
	I. Tr. I. 5 29		I. Tr. I. *12 51		I. Tr. I. 20 11
	I. Sh. E. 6 35		III. Sh. E. *13 49		I. Sh. E. 21 27
	I. Tr. E. † 7 44		I. Sh. E. *14 1		I. Tr. E. 22 26
21	I. Ec. D. 1 32 23.3		I. Tr. E. *15 5	31	I. Ec. D. *16 22 51.6
	I. Oc. R. 4 52		III. Tr. I. *15 40		I. Oc. R. 19 34
	II. Sh. I. † 7 46		III. Tr. E. † 18 8		II. Sh. I. 23 38
	II. Tr. I. *10 3	26	I. Ec. D. * 8 57 38.0		
	II. Sh. E. *10 21		I. Oc. R. *12 13		

## Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

d



III.

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II.

d



IV.

No Eclipse  
of this Satellite.

The abbreviations denote, as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## NOVEMBER.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s	
1	II. Tr. I.	1	35		8	II. Tr. E. †	6	30		15	I. Tr. I.	*18	9		
	II. Sh. E.	2	13			I. Sh. I.	*15	34			I. Sh. E.	19	43		
	II. Tr. E.	4	11			I. Tr. I.	*16	24			I. Tr. E.	20	24		
	I. Sh. I.	*13	41			I. Sh. E.	*17	49		III. Sh. I.	23	19			
	I. Tr. I.	*14	38			I. Tr. E. †	18	39		16	III. Sh. E.	1	50		
III. Sh. I.	*15	20			III. Sh. I.	19	19			III. Tr. I.	2	3			
I. Sh. E.	*15	55			III. Sh. E.	21	50			III. Tr. E.	4	31			
I. Tr. E.	*16	53			III. Tr. I.	22	40			I. Ec. D.	*14	39	6.8		
III. Sh. E.	*17	50			9	III. Tr. E.	1	7		I. Oc. R.	*17	31			
III. Tr. I.	19	12				I. Ec. D.	*12	45	10.0	II. Ec. D.	23	57	33.0		
III. Tr. E.	21	40				I. Oc. R.	*15	46		17	II. Oc. R.	3	50		
2	I. Ec. D.	*10	51	20.7		II. Ec. D.	21	21	37.2		I. Sh. I.	*11	57		
I. Oc. R.	*14	0			10	II. Oc. R.	1	33			I. Tr. I.	*12	36		
II. Ec. D.	†18	45	37.2			I. Sh. I.	*10	3			I. Sh. E.	*14	12		
II. Oc. R.	23	13				I. Tr. I.	*10	51			I. Tr. E.	*14	50		
3	I. Sh. I.	*8	9			I. Sh. E.	*12	18		18	I. Ec. D.	*9	7	35.4	
I. Tr. I.	*9	5				I. Tr. E.	*13	5			I. Oc. R.	*11	57		
I. Sh. E.	*10	24			11	I. Ec. D.	*7	13	36.7		II. Sh. I.	*18	5		
I. Tr. E.	*11	19				I. Oc. R.	*10	12			II. Tr. I.	†19	19		
4	I. Ec. D.	5	19	45.7		II. Sh. I.	*15	30			II. Sh. E.	20	42		
I. Oc. R.	*8	27				II. Tr. I.	*17	2			II. Tr. E.	21	55		
II. Sh. I.	*12	55				II. Sh. E.	*18	6		19	I. Sh. I.	†6	26		
II. Tr. I.	*14	44				II. Tr. E.	19	39			I. Tr. I.	*7	2		
II. Sh. E.	*15	31			12	I. Sh. I.	4	32			I. Sh. E.	*8	41		
II. Tr. E.	*17	21				I. Tr. I.	5	17			I. Tr. E.	*9	16		
5	I. Sh. I.	2	38			I. Sh. E. †	6	46			III. Ec. D.	*13	17	8.6	
I. Tr. I.	3	31				I. Tr. E.	*7	32			III. Oc. R.	*18	5		
I. Sh. E.	4	52				III. Ec. D.	*9	17	46.4	20	I. Ec. D.	3	36	7.4	
III. Ec. D.	5	18	27.3			III. Ec. R.	*11	37	34.5		I. Oc. R.	†6	23		
I. Tr. E.	5	46				III. Oc. D.	*12	16			II. Ec. D.	*13	15	14.4	
III. Ec. R.	*7	37	7.9			III. Oc. R.	*14	43			II. Oc. R.	*16	59		
III. Oc. D.	*8	50			13	I. Ec. D.	1	42	6.6	21	I. Sh. I.	0	54		
III. Oc. R.	*11	18				I. Oc. R.	4	39			I. Tr. I.	1	28		
I. Ec. D.	23	48	13.5			II. Ec. D.	*10	39	18.5		I. Sh. E.	3	9		
6	I. Oc. R.	2	53			II. Oc. R.	*14	42			I. Tr. E.	3	43		
II. Ec. D.	*8	3	18.5			I. Sh. I.	23	0			I. Ec. D.	22	4	36.5	
II. Oc. R.	*12	23			14	I. Tr. I.	23	43		22	I. Oc. R.	0	49		
I. Sh. I.	21	6				I. Sh. E.	1	15			II. Sh. I.	*7	23		
I. Tr. I.	21	58				I. Tr. E.	1	58			II. Tr. I.	*8	26		
I. Sh. E.	23	21				I. Ec. D.	20	10	33.8		II. Sh. E.	*9	59		
7	I. Tr. E.	0	12			I. Oc. R.	23	5			II. Tr. E.	*11	3		
I. Ec. D.	†18	16	39.0		15	II. Sh. I.	4	47			I. Sh. I.	†19	23		
I. Oc. R.	21	20				II. Tr. I.	†6	11			I. Tr. I.	19	54		
8	II. Sh. I.	2	12			II. Sh. E.	*7	24			I. Sh. E.	21	38		
II. Tr. I.	3	54				II. Tr. E.	*8	47			I. Tr. E.	22	9		
II. Sh. E.	4	48				I. Sh. I.	*17	29							

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## NOVEMBER.

Day.	h	m	s	Day.	h	m	s	Day.	h	m	s
23	III. Sh. I.	3	18	25	II. Sh. E.	23	17	28	I. Ec. D.	23	58 48.0
	III. Tr. I.	†	5 23		II. Tr. E.	0	10	29	I. Oc. R.	2	33
	III. Sh. E.	†	5 50		I. Sh. I.	*	8 20		II. Sh. I.	*	9 58
	III. Tr. E.	*	7 50		I. Tr. I.	*	8 46		II. Tr. I.	*	10 41
	I. Ec. D.	*16	33 11.7		I. Sh. E.	*10	35		II. Sh. E.	*12	35
	I. Oc. R.	†19	15		I. Tr. E.	*11	1		II. Tr. E.	*13	18
24	II. Ec. D.	2	33 25.0		III. Ec. D.	*17	17 13.0		I. Sh. I.	21	17
	II. Oc. R.	†	6 6		III. Oc. R.	21	24		I. Tr. I.	21	38
	I. Sh. I.	*13	52	27	I. Ec. D.	†	5 30 16.7		I. Sh. E.	23	32
	I. Tr. I.	*14	20		I. Oc. R.	*	8 7		I. Tr. E.	23	53
	I. Sh. E.	*16	6		II. Ec. D.	*15	51 7.0	30	III. Sh. I.	*	7 17
	I. Tr. E.	*16	35		II. Oc. R.	†19	14		III. Tr. I.	*	8 39
25	I. Ec. D.	*11	1 42.4	28	I. Sh. I.	2	49		III. Sh. E.	*	9 51
	I. Oc. R.	*13	41		I. Tr. I.	3	12		III. Tr. E.	*11	8
	II. Sh. I.	20	40		I. Sh. E.	†	5 3		I. Ec. D.	*18	27 25.5
	II. Tr. I.	21	34		I. Tr. E.	†	5 27		I. Oc. R.	20	59

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.

d  
\*

III.

d  
\*

II.

d  
\*

IV.

No Eclipse  
of this Satellite.

## DECEMBER.

Day.	h	m	s	Day.	h	m	s	Day.	h	m	s
1	II. Ec. D.	†	5 9 14.0	3	I. Tr. I.	*10	30	6	I. Ec. D.	1	53 8.8
	II. Oc. R.	*	8 21		I. Sh. E.	*12	29		I. Oc. R.	†	4 17
	I. Sh. I.	*15	46		I. Tr. E.	*12	44		II. Sh. I.	*12	34
	I. Tr. I.	*16	4		III. Ec. D.	21	16 48.2		II. Tr. I.	*12	55
	I. Sh. E.	*18	1	4	III. Oc. R.	0	40		II. Sh. E.	*15	12
	I. Tr. E.	*18	18		I. Ec. D.	*7	24 35.4		II. Tr. E.	*15	32
2	I. Ec. D.	*12	55 58.5		I. Oc. R.	*	9 51		I. Sh. I.	23	12
	I. Oc. R.	*15	25		II. Ec. D.	*18	26 56.7		I. Tr. I.	23	21
	II. Sh. I.	23	16		II. Oc. R.	21	28	7	I. Sh. E.	1	26
	II. Tr. I.	23	48		I. Sh. I.	†	4 43		I. Tr. E.	1	36
3	II. Sh. E.	1	53	5	I. Tr. I.	†	4 56		III. Sh. I.	*11	17
	II. Tr. E.	2	25		I. Sh. E.	*	6 58		III. Tr. I.	*11	55
	I. Sh. I.	*10	14		I. Tr. E.	*	7 10		III. Sh. E.	*13	52

The abbreviations denote as follows:—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## DECEMBER.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
7	III. Tr. E.	*14	23		15	II. Oc. D.	*10	12		22	I. Tr. E.	23	29	
	I. Ec. D.	20	21	48.7		II. Ec. R.	*12	54	9.2		I. Sh. E.	23	44	
	I. Oc. R.	22	43			I. Tr. I.	†19	31		23	I. Oc. D.	†18	21	
8	II. Ec. D.	*7	45	0.3		I. Sh. I.	†19	35			I. Ec. R.	20	50	21.3
	II. Oc. R.	*10	35			I. Tr. E.	21	45		24	II. Tr. I.	*6	30	
	I. Sh. I.	*17	40		16	I. Sh. E.	21	50			II. Sh. I.	*7	5	
	I. Tr. I.	*17	47			I. Oc. D.	*16	37			II. Tr. E.	*9	7	
	I. Sh. E.	†19	55			I. Ec. R.	†18	55	28.5		II. Sh. E.	*9	43	
	I. Tr. E.	20	2		17	II. Tr. I.	†4	16			I. Tr. I.	*15	40	
9	I. Ec. D.	*14	50	24.0		II. Sh. I.	†4	28			I. Sh. I.	*15	58	
	I. Oc. R.	*17	8			II. Tr. E.	*6	52			I. Tr. E.	*17	55	
10	II. Sh. I.	1	52			II. Sh. E.	*7	6			I. Sh. E.	†18	13	
	II. Tr. I.	2	2			I. Tr. I.	*13	56		25	III. Oc. D.	*7	56	
	II. Sh. E.	†4	30			I. Sh. I.	*14	3			III. Ec. R.	*11	42	27.6
	II. Tr. E.	†4	38			I. Tr. E.	*16	11			I. Oc. D.	*12	47	
	I. Sh. I.	*12	9			I. Sh. E.	*16	18			I. Ec. R.	*15	19	7.9
	I. Tr. I.	*12	13		18	III. Oc. D.	†4	41		26	II. Oc. D.	1	32	
	I. Sh. E.	*14	24			III. Ec. R.	*7	41	36.8		II. Ec. R.	†4	48	1.1
	I. Tr. E.	*14	28			I. Oc. D.	*11	3			I. Tr. I.	*10	6	
11	III. Ec. D.	1	16	31.1		I. Ec. R.	*13	24	12.5		I. Sh. I.	*10	27	
	III. Oc. R.	3	56			II. Oc. D.	23	18			I. Tr. E.	*12	21	
	I. Ec. D.	*9	19	3.5	19	II. Ec. R.	2	12	1.8		I. Sh. E.	*12	42	
	I. Oc. R.	*11	34			I. Tr. I.	*8	22		27	I. Oc. D.	*7	13	
	II. Ec. D.	21	2	43.7		I. Sh. I.	*8	32			I. Ec. R.	*9	47	49.9
	II. Oc. R.	23	41			I. Tr. E.	*10	37			II. Tr. I.	19	38	
12	I. Sh. I.	*6	38			I. Sh. E.	*10	47			II. Sh. I.	20	23	
	I. Tr. I.	*6	39		20	I. Oc. D.	*5	29			II. Tr. E.	22	15	
	I. Sh. E.	*8	52			I. Ec. R.	*7	52	52.3		II. Sh. E.	23	2	
	I. Tr. E.	*8	54			II. Tr. I.	*17	23		28	I. Tr. I.	†4	32	
13	I. Oc. D.	3	45			II. Sh. I.	*17	47			I. Sh. I.	*4	55	
	I. Oc. R.	*6	0			II. Tr. E.	20	0			I. Tr. E.	*6	47	
	II. Tr. I.	*15	9			II. Sh. E.	20	25			I. Sh. E.	*7	10	
	II. Sh. I.	*15	10		21	I. Tr. I.	2	48			III. Tr. I.	21	40	
	II. Tr. E.	*17	46			I. Sh. I.	3	1			III. Sh. I.	23	16	
	II. Sh. E.	*17	48			I. Tr. E.	*5	3		29	III. Tr. E.	0	12	
14	I. Tr. I.	1	5			I. Sh. E.	*5	16			I. Oc. D.	1	39	
	I. Sh. I.	1	6			III. Tr. I.	†18	24			III. Sh. E.	1	55	
	I. Tr. E.	3	20			III. Sh. I.	†19	17			I. Ec. R.	†4	16	39.1
	I. Sh. E.	3	21			III. Tr. E.	20	55			II. Oc. D.	*14	40	
	III. Tr. I.	*15	9			III. Sh. E.	21	54			II. Ec. R.	†18	6	4.6
	III. Sh. I.	*15	16			I. Oc. D.	23	55			I. Tr. I.	22	58	
	III. Tr. E.	*17	39		22	I. Ec. R.	2	21	39.3		I. Sh. I.	23	24	
	III. Sh. E.	*17	52			II. Oc. D.	*12	25		30	I. Tr. E.	1	13	
	I. Oc. D.	22	11			II. Ec. R.	*15	30	7.8		I. Sh. E.	1	39	
15	I. Ec. R.	0	26	48.8		I. Tr. I.	21	14			I. Oc. D.	20	5	
						I. Sh. I.	21	29						

The abbreviations denote as follows :—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite. Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## DECEMBER.

Day.		h	m	s	Day.		h	m	s	Day.		h	m	s
30	I. Ec. R.	22	45	23.6	31	II. Tr. E.	*11	23		31	I. Sh. I.	†17	53	
31	II. Tr. I.	*	8	46		II. Sh. E.	*12	20			I. Tr. E.	19	39	
	II. Sh. I.	*	9	41		I. Tr. I.	*17	24			I. Sh. E.	20	8	

Phases of the Eclipses of the Satellites for an inverting Telescope.

I.



III.



II.



IV.

No Eclipse  
of this Satellite.

The abbreviations denote as follows :—Ec. Eclipse. Oc. Occultation. Tr. Transit of Satellite.  
Sh. Transit of Shadow. D. Disappearance. R. Reappearance. I. Ingress. E. Egress.



## MEAN TIME.

## JUNE.

CONFIGURATIONS AT 15<sup>h</sup>.

Day of the Month.	West.	East.
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## THE SATELLITES OF JUPITER

ARE INVISIBLE FROM APRIL 30, UNTIL JUNE 20,

JUPITER BEING TOO NEAR TO THE SUN.

20		·3	·1	·2	○		·4
21			·3		○	1·	2·
22	2· ○		·1		○	·3	4·
23	1· ○		·2		○	·3	4·
24					○ ·1	·2	4· 3·
25				1·	·4 ○	·3	2·
26			3· 4· 2·		○	·1	
27		4·	·3	·1	·2	○	
28		4·		·3		○	1·
29		4·		·1	·4 ○	·3	
30		·4		·2		○	1·

This Table represents, at 15<sup>h</sup> after *Mean Noon* of each day of the Month, the relative positions of the images of Jupiter and his Satellites, as they would appear (disregarding their latitudes) in an inverting telescope. Jupiter is indicated by the white circles (○) in the centre of the page; the Satellites by points. The numerals, 1, 2, 3, and 4, annexed to the points, serve to distinguish the Satellites from each other; and their positions are such as to indicate the directions of the Satellites' motions, which are in all cases to be considered as *towards the numerals*. When a Satellite is at its greatest elongation, the point is placed above or below the centre of the numeral. A white circle (○) at the left or right hand of the page, denotes that the Satellite placed by the side of it is on the disc of Jupiter, and a black circle (●) that it is either *behind* the disc, or in the shadow, of Jupiter.



## MEAN TIME.

## NOVEMBER.

CONFIGURATIONS AT 11<sup>h</sup>.

Day of the Month.	West.		East.
1		2. ○ 1. 3.	4.
2	1. ●	3. 2.	○ 4.
3		3. 1. ○	2. 4.
4		3. ○ 1.	4.
5	3. ●	2. 1.	○ 4.
6	2. ●		○ 4. 1. 3.
7		1. ○	2. 3.
8		4. 2. ○	1. 3.
9	4.	2. 3. 1. ○	
10	4.	3. ○	2. ○ 1.
11	4.	3. ○ 1. 2.	
12	4.	2. 1. ○	3. ●
13	4.	○ 1. 3.	2. ●
14		4. 1. ○	2. 3.
15		2. ○ 4. 1. 3.	
16		2. 3. 1. ○	4.
17		3. ○ 1. 2.	4.
18	1. ●	3. ○	2. 4.
19		2. 1. ○	4.
20		2. ○ 1. 3.	4.
21		1. ○	2. 3. 4.
22	2. ○		1. 3.
23		2. 1. 3. 4. ○	
24		3. 4. ○	1. 2.
25	4. 3.	○ 1. 2.	
26	4.	2. 3. ○	○ 1.
27	4.	2. ○ 1. 3.	
28	4.	1. ○	2. 3.
29	4.	○ 1. 3.	○ 2.
30		4. 2. 1. ○	○ 3.

This Table represents, at 11<sup>h</sup> after *Mean Noon* of each day of the Month, the relative positions of the images of Jupiter and his Satellites, as they would appear (disregarding their latitudes) in an inverting telescope. Jupiter is indicated by the white circles (○) in the centre of the page; the Satellites by points. The numerals, 1, 2, 3, and 4, annexed to the points, serve to distinguish the Satellites from each other; and their positions are such as to indicate the directions of the Satellites' motions, which are in all cases to be considered as *towards the numerals*. When a Satellite is at its greatest elongation, the point is placed above or below the centre of the numeral. A white circle (○) at the left or right hand of the page, denotes that the Satellite placed by the side of it is on the disc of Jupiter, and a black circle (●) that it is either *behind* the disc, or in the shadow, of Jupiter.



## MEAN TIME.

## DECEMBER.

### CONFIGURATIONS AT 10<sup>h</sup>.

Day of the Month.	West.	East.
1	3. 4. ○ 2. 1.	
2	3. 1. ○ 4. 2.	
3	3. 2. ○ 1.	4.
4	2. 1. ○ 3.	4.
5	1. ○ 2. 3.	4.
6	○ 2. 1. 3.	4.
7	2. 1. ○ 3.	4.
8	2. ● 3. ○ 1. 4.	
9	3. 1. ○ 4. 2.	
10	3. 2. 4. ○ 1.	
11	4. 2. ○ 3.	● 1.
12	4. 1. ○ 2. 3.	
13	4. 2. 1. ○ 3.	
14	4. 3. ○ 2. 1.	
15	4. 3. ○ 2. 1.	
16	4. 3. 1. ○ 2.	
17	4. 2. ○ 1.	
18	4. 1. ○ 2.	
19	1. ○ 2. 4. 3.	
20	○ 1. 2. 3. 4.	
21	2. 1. ○ 3. 4.	
22	3. 2. ○ 1. 4.	
23	3. 1. ○ 2. 4.	
24	3. 1. ○ 2. 4.	
25	3. ● 2. 1. ○ 4.	
26	○ 1. 4. 2. 3.	
27	4. 1. ○ 2. 3.	
28	4. 2. 1. ○ 3.	
29	4. 3. 4. ○ 1.	
30	4. 3. 1. ○ 2.	
31	4. 3. ○ 1.	○ 2.

This Table represents, at 10<sup>h</sup> after *Mean Noon* of each day of the Month, the relative positions of the images of Jupiter and his Satellites, as they would appear (disregarding their latitudes) in an inverting telescope. Jupiter is indicated by the white circles (○) in the centre of the page; the Satellites by points. The numerals, 1, 2, 3, and 4, annexed to the points, serve to distinguish the Satellites from each other; and their positions are such as to indicate the directions of the Satellites' motions, which are in all cases to be considered as *towards the numerals*. When a Satellite is at its greatest elongation, the point is placed above or below the centre of the numeral. A white circle (○) at the left or right hand of the page, denotes that the Satellite placed by the side of it is *on the disc of Jupiter*, and a black circle (●) that it is either *behind the disc*, or in the *shadow*, of Jupiter.



## MEAN TIME.

## JANUARY.

Day.	h	m	°	'	
2	12	6	♀	♂	( - - - - ♀ 2 29 S.
2	18	19	♂	♂	( - - - - ♂ 1 8 S.
5	4	12	♂	Stationary.	
5	4	37	♀	♂	( - - - - ♀ 2 53 N.
5	5	0	♀	in	♂
6	9	52	♀	♂	♂ - - - - ♀ 0 52 S.
6	18	12	ψ	□	○
9	21	5	♂	♂	○
11	1	42	♂	♂	( - - - - ♂ 4 21 N.
14	20	59	♀	♂	♂ Capricor. * (5 <sup>m</sup> .3) W.
16	13	41	♂	♂	( - - - - ♂ 1 18 N.
17	-	-	(	eclip., partly vis. at Green <sup>b</sup> .	
18	-	-	♀	at greatest brilliancy.	
18	1	49	♀	greatest elong.	18 41 E.
18	12	0	♂	greatest Hel. Lat. S.	
19	5	31	♀	in	♂
23	19	23	♀	in Perihelion.	
24	4	44	♀	Stationary.	
27	14	1	♂	♂	( - - - - ♂ 1 43 S.
28	10	32	♀	♂	♂ - - - - ♀ 3 52 N.
31	-	-	○	eclipsed, invis. at Green <sup>b</sup> .	
31	0	6	♀	Stationary.	
31	10	28	♀	♂	( - - - - ♀ 5 1 N.
31	17	29	♂	□	○
31	20	45	♂	♂	( - - - - ♂ 0 58 N.

## FEBRUARY.

Day.	h	m	°	'	
2	8	56	♀	♂	( - - - - ♀ 9 28 N.
2	15	6	♀	Inf. ♂	○
3	3	0	♀	greatest Hel. Lat. N.	
7	13	43	♂	♂	( - - - - ♂ 4 24 N.
7	17	0	♀	in Perihelion.	
11	6	40	♂	in Perihelion.	
12	21	56	♂	♂	( - - - - ♂ 1 22 N.
14	12	5	♀	Stationary.	
17	21	7	♀	♂	♂ - - - - ♀ 10 1 N.
23	3	24	♀	Inf. ♂	○
23	23	36	♂	♂	( - - - - ♂ 1 26 S.
26	14	42	♀	in	♂
27	10	43	♀	♂	( - - - - ♀ 1 8 N.
28	5	23	♀	greatest elong.	27 5 W.
28	16	45	♀	♂	( - - - - ♀ 11 59 N.

## MARCH.

Day.	h	m	°	'	
1	16	53	♀	greatest Hel. Lat. N.	
1	23	1	♂	♂	( - - - - ♂ 2 54 N.
7	5	15	♂	♂	( - - - - ♂ 4 13 N.
8	19	0	♀	in Aphelion.	
9	23	8	♀	♂	♀ - - - - ♀ 9 51 S.
11	1	28	♀	♂	Aquarii * (4 <sup>m</sup> .6) E.
12	6	38	♂	♂	( - - - - ♂ 1 16 N.
12	6	40	♂	♂	○
14	7	26	♀	Stationary.	
18	12	42	♂	□	○
20	7	32	○	enters ♄, Spring comm.	
23	7	43	♂	♂	( - - - - ♂ 1 6 S.
25	21	23	♂	Stationary.	
27	21	59	♀	♂	( - - - - ♀ 7 30 N.
29	5	27	♀	greatest Hel. Lat. S.	
30	6	6	♀	♂	( - - - - ♀ 2 21 N.
31	-	-	♀	at greatest brilliancy.	
31	1	25	♂	♂	( - - - - ♂ 4 17 N.

## APRIL.

Day.	h	m	°	'	
3	22	49	♂	♂	( - - - - ♂ 3 53 N.
6	20	56	♂	Stationary.	
7	13	17	♂	□	○
7	14	44	♀	♂	♂ - - - - ♀ 0 50 S.
8	14	38	♂	♂	( - - - - ♂ 1 1 N.
8	20	2	ψ	♂	○
13	4	18	♀	Sup. ♂	○
17	4	43	♀	in	♂
19	15	40	♂	♂	( - - - - ♂ 0 49 S.
21	18	39	♀	in Perihelion.	
25	21	53	♀	♂	( - - - - ♀ 4 36 N.
26	18	20	♀	in	♂
29	4	10	♂	♂	( - - - - ♂ 4 48 N.
30	20	42	♀	♂	♂ - - - - ♀ 2 54 N.



MEAN TIME.

MAY.

Day.	h	m		°	'	
1	17	31	♂ ♀	♄	3 30	N.
1	20	28	♀	♄	6 24	N.
2	2	20	♀			greatest Hel. Lat. N.
4	1	50	♀		46 5	W.
5	22	0	♂	♄	0 42	N.
10	23	33	♀		21 34	E.
16	23	40	♂	♄	0 43	S.
23	14	53	♀			Stationary.
24	14	34	♂	♄		
25	13	56	♀			in ☿
25	17	32	♀	♄	3 19	N.
28	6	49	♂	♄	4 27	N.
29	13	2	♂	♄	3 6	N.
30	12	38	♀	♄	1 27	N.
30	22	26	♀			in Aphelion.

JUNE.

Day.	h	m		°	'	
1	17	19	♀	♄	7 <sup>m</sup> .0	W.
2	5	41	♂	♄	0 26	N.
4	6	3	♀			Inf. ♂ ☉
4	18	17	♀			in Aphelion.
13	6	59	♂	♄	0 51	S.
14	21	45	♂			in ☿
16	4	5	♂	♄		
16	5	46	♀			Stationary.
21	3	56	☉			enters ♄, Summer comm <sup>a</sup> .
22	15	4	♀			greatest Hel. Lat. S.
24	21	35	♀	♄	2 11	N.
25	4	14	♀			greatest Hel. Lat. S.
26	8	22	♂	♄	3 27	N.
26	9	3	♂	♄	2 42	N.
26	14	49	♀	♄	0 28	S.
27	1	12	♂	♄	0 44	N.
28	-	-	☉			eclipsed, invis. at Green <sup>h</sup> .
28	20	5	♀		21 40	W.
29	14	43	♂	♄	0 16	N.

JULY.

Day.	h	m		°	'	
1	12	56	☉			in Apogee.
4	2	5	♀	♄	5 <sup>m</sup> .8	E.
9	18	55	♀	♄	6 <sup>m</sup> .3	E.
9	22	55	♀	♄	13 <sup>m</sup> .2	E.
10	12	54	♂	♄	1 4	S.
10	15	50	♀	♄	0 11	S.
12	-	-	☉			eclipsed, vis. at Green <sup>h</sup> .
13	7	23	♀	♄	1 7	S.
14	0	44	☿			
14	4	1	♀			in ☿
14	13	5	♂	♄		
18	17	54	♀			in Perihelion.
21	8	48	♀	♄	0 43	N.
24	4	52	♂	♄	2 15	N.
25	3	39	♀	♄	0 41	N.
25	7	47	♂	♄	2 8	N.
26	17	20	♀			Sup. ♂ ☉
27	1	27	♂	♄	0 7	N.
27	16	0	♀	♄	0 9	N.
28	-	-	☉			eclipsed, invis. at Green <sup>h</sup> .
28	2	21	♀	♄	0 8	N.
29	1	33	♀			greatest Hel. Lat. N.
29	3	47	♀	♄	1 29	S.
29	5	44	♀	♄	0 9	N.

AUGUST.

Day.	h	m		°	'	
6	17	39	♂	♄	1 13	S.
9	7	17	♀	♄	10 <sup>m</sup> .6	W.
15	15	24	♀	♄	0 36	S.
17	21	44	♀			in ☿
20	23	12	♂	♄	1 46	N.
21	13	12	♀			in ☿
23	4	35	♂	♄	0 41	N.
23	7	56	♀	♄	9 <sup>m</sup> .4	E.
23	13	18	♂	♄	0 4	S.
24	7	10	♀	♄	1 9	S.
26	8	34	♂			Stationary.
28	1	15	♀	♄	6 13	S.
31	6	23	♂	♄	0 25	N.
31	17	33	♀			in Aphelion.



## MEAN TIME.

## SEPTEMBER.

Day.	h	m	
1	3	0	♂ δ μ <sup>a</sup> Canceri * (9 <sup>m</sup> .6) E.
2	22	43	♂ δ ☾ - - - - ♀ 1 10 S.
7	16	33	♀ greatest elong. 26 48 E.
13	16	48	♀ δ α Leonis * (7 <sup>m</sup> .3) W.
14	19	17	♂ ☐ ☉
16	4	54	♀ δ α Virginis * (15 <sup>m</sup> .8) E.
17	14	9	♂ δ ☾ - - - - ♀ 1 17 N.
17	23	23	♂ ☐ ☉
20	0	53	♂ δ ☾ - - - - ♀ 0 20 S.
20	4	0	♀ in Perihelion.
20	22	36	♂ δ ☾ - - - - ♂ 0 44 S.
21	0	25	♀ Stationary.
21	3	27	♀ greatest Hel. Lat. S.
22	18	9	☉ enters ♌, Autumn comm.
23	7	13	♀ δ ☾ - - - - ♀ 2 59 S.
25	15	11	♀ δ ☾ - - - - ♀ 9 29 S.
30	6	12	♂ δ ☾ - - - - ♀ 0 56 S.

## OCTOBER.

Day.	h	m	
3	17	33	♀ Inf. δ ☉
10	3	17	♀ in ☿ 0
11	11	0	♀ δ ♀ - - - - ♀ 1 11 S.
12	1	33	♀ Stationary.
12	9	34	♀ greatest Hel. Lat. N.
13	11	12	♂ ☐ ☉
14	12	49	♂ Stationary.
14	17	11	♀ in Perihelion.
14	23	45	♂ δ ☾ - - - - ♀ 0 55 N.
17	10	30	♂ δ ☾ - - - - ♀ 0 38 S.
19	4	30	♀ greatest elong. 18 12 W.
19	13	38	♂ δ ☾ - - - - ♂ 1 57 S.
19	15	49	♂ ☐ ☉
22	19	47	♀ δ ☾ - - - - ♀ 3 12 S.
23	6	0	♀ δ ☾ - - - - ♀ 3 55 S.
25	0	51	♀ greatest Hel. Lat. N.
27	17	31	♂ δ ☾ - - - - ♀ 0 36 S.
30	11	48	♂ δ α Leonis * (13 <sup>m</sup> .2) W.

## NOVEMBER.

Day.	h	m	
1	15	16	♂ Stationary. 0
11	3	21	♂ δ ☾ - - - - ♀ 0 51 N.
11	8	36	♀ δ ♀ - - - - ♀ 0 17 S.
13	17	12	♂ δ ☾ - - - - ♀ 0 52 S.
17	1	6	♂ δ ☾ - - - - ♂ 2 46 S.
17	12	28	♀ in ☿
22	5	43	♀ δ ☾ - - - - ♀ 3 9 S.
22	6	43	♀ Sup. δ ☉
22	12	8	♀ δ ☾ - - - - ♀ 4 1 S.
24	2	40	♂ δ γ Leonis * (6 <sup>m</sup> .3) W.
24	8	25	♂ δ ☾ - - - - ♀ 0 16 S.
27	16	49	♀ in Aphelion.

## DECEMBER.

Day.	h	m	
1	10	23	♂ δ σ Leonis * (3 <sup>m</sup> .6) W.
4	13	51	♀ δ θ Ophiuchi * 0 9 S.
7	11	10	♀ in ☿
7	19	17	♀ Sup. δ ☉
8	2	57	♂ δ ☾ - - - - ♀ 1 7 N.
10	21	41	♂ δ ☾ - - - - ♀ 0 56 S.
13	1	0	♂ ☐ ☉
15	7	40	♂ δ ☾ - - - - ♂ 3 0 S.
16	0	0	♂ ☐ ☉
17	6	0	♂ greatest Hel. Lat. N.
18	2	13	♀ greatest Hel. Lat. S.
19	8	4	♀ δ ♀ - - - - ♀ 1 18 S.
21	12	13	☉ enters ♏, Winter comm.
22	-	-	☉ eclipsed, vis. at Green <sup>d</sup> .
22	0	54	♂ δ ☾ - - - - ♀ 0 0
22	6	24	♀ δ ☾ - - - - ♀ 1 6 S.
22	10	4	♂ δ ☉
23	5	56	♀ δ ☾ - - - - ♀ 1 19 S.



ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION,  
MAGNITUDE, AND APPEARANCE OF SATURN'S RING.

Mean Noon.	$p$	$a'$	$b'$	$a''$	$b''$	$l$	$l'$
1869.							
Dec. 18	+5° 29' 3	34° 05	+15° 41	22° 64	+10° 25	+26° 54' 7	+26° 48' 4
1870.							
Jan. 7	5 43' 7	34° 33	15° 50	22° 83	10° 31	26 50' 5	26 48' 9
— 27	5 56' 1	34° 91	15° 70	23° 22	10° 44	26 43' 5	26 49' 3
Feb. 16	6 5' 8	35° 78	16° 02	23° 80	10° 65	26 35' 4	26 49' 5
Mar. 8	6 12' 5	36° 89	16° 44	24° 53	10° 93	26 28' 1	26 49' 4
— 28	6 15' 8	38° 13	16° 95	25° 36	11° 27	26 23' 2	26 49' 2
April 17	6 15' 7	39° 39	17° 50	26° 19	11° 63	26 22' 2	26 48' 7
May 7	6 12' 4	40° 49	18° 02	26° 93	11° 98	26 25' 1	26 48' 1
— 27	6 6' 2	41° 25	18° 42	27° 43	12° 25	26 31' 1	26 47' 4
June 16	5 58' 3	41° 53	18° 62	27° 62	12° 38	26 38' 5	26 46' 4
July 6	5 50' 1	41° 27	18° 59	27° 45	12° 36	26 45' 9	26 45' 2
— 26	5 43' 3	40° 53	18° 32	26° 95	12° 18	26 52' 2	26 43' 8
Aug. 15	5 39' 4	39° 44	17° 88	26° 23	11° 89	26 57' 3	26 42' 3
Sept. 4	5 39' 3	38° 19	17° 35	25° 40	11° 54	27 1' 0	26 40' 5
— 24	5 43' 1	36° 95	16° 80	24° 57	11° 17	27 3' 0	26 38' 6
Oct. 14	5 50' 5	35° 84	16° 29	23° 83	10° 84	27 2' 6	26 36' 5
Nov. 3	6 0' 5	34° 95	15° 86	23° 24	10° 55	26 59' 0	26 34' 2
— 23	6 11' 9	34° 34	15° 51	22° 83	10° 32	26 51' 4	26 31' 6
Dec. 13	6 23' 7	34° 03	15° 27	22° 63	10° 15	26 39' 5	26 28' 9
1871.							
Jan. 2	+6° 35' 0	34° 04	+15° 13	22° 64	+10° 06	+26 23' 8	+26 26' 0

$p$  denotes the inclination of the Northern semi-minor axes of the Rings to the circle of Declination ; + East, — West.

$a'$  the apparent outer *major* axis of the outer Ring.

$b'$  ——— outer *minor* axis of the outer Ring ; + North surface visible, — South surface visible.

$a''$  ——— inner *major* axis of the inner Ring.

$b''$  ——— inner *minor* axis of the inner Ring.

$l$  the elevation of the Earth above the plane of the Ring, as seen from Saturn ; + North, — South.

$l'$  the elevation of the Sun above the plane of the Ring, as seen from Saturn ; + North, — South.



## MEAN TIME OF THE GREATEST LIBRATION OF THE MOON'S APPARENT DISC.

Jan.	2	18 <sup>h</sup>	S.W.
	15	3	N.E.
	29	8	S.W.
Feb.	11	23	N.E.
	24	17	N.W.
Mar.	12	3	S.E.
	24	8	S.W.
Apr.	9	9	S.E.
	21	12	S.W.
May	7	11	S.E.
	19	18	S.W.
June	4	2	S.E.
	16	21	S.W.
	30	15	S.E.
July	14	15	S.W.
	27	5	S.E.
Aug.	10	19	S.W.
	23	14	S.E.
Sept.	6	3	S.W.
	20	13	S.E.
Oct.	3	0	S.W.
	18	18	S.E.
	30	21	S.W.
Nov.	16	1	S.E.
	28	3	S.W.
Dec.	14	2	S.E.
	26	10	S.W.

The Moon's Libration is here supposed to take place in the plane of her Orbit :—and by the time of the greatest Libration of her Apparent Disc is to be understood the time about which, to an observer at the centre of the Earth, the variation of the Disc from its mean state has attained its maximum.

The right-hand column indicates the quadrant of the Moon's Disc in which additional surface is rendered visible by the Libration.

## ILLUMINATED PORTION OF THE DISCS OF VENUS AND MARS.

1870.	VENUS.	MARS.
Jan. 15	0.294	0.994
Feb. 14	0.031	0.999
Mar. 15	0.118	1.000
Apr. 15	0.379	0.998
May 15	0.550	0.993
June 15	0.681	0.985
July 15	0.783	0.973
Aug. 15	0.868	0.958
Sept. 15	0.932	0.941
Oct. 15	0.974	0.924
Nov. 15	0.996	0.909
Dec. 15	1.000	0.903

The numbers given in this Table represent the versed sines of the illuminated portion of the Discs, the apparent Diameters of the Planets being considered as unity.



MOON'S EQUATOR.						Moon's	Motion of
Mean Noon.	Inclination to the Earth's Equator.	Ascending Node on the Earth's Equator to Ascending Node on Ecliptic.	Ascending Node on the Earth's Equator.	Mean Longitude.		Mean Longitude.	
	$i$	$\Delta$	$\Omega'$	$l_o$			
Jan. I	24 14' 5"	diff. -0' 7"	302 19' 7"	diff. -1' 1"	269 50' 4"		Days.
II	24 13' 8"	0' 7"	301 49' 0"	1' 1"	41 36' 2"	I	13 10' 6"
21	24 13' 1"	0' 8"	301 18' 2"	1' 1"	173 22' 0"	2	26 21' 2"
31	24 12' 3"	0' 7"	300 47' 3"	1' 1"	305 7' 9"	3	39 31' 8"
Feb. 10	24 11' 6"	0' 8"	300 16' 5"	1' 0"	76 53' 7"	4	52 42' 3"
20	24 10' 8"	0' 7"	299 45' 7"	1' 0"	208 39' 6"	5	65 52' 9"
Mar. 2	24 10' 1"	0' 7"	299 14' 8"	1' 0"	340 25' 4"	6	79 3' 5"
12	24 9' 4"	0' 8"	298 44' 0"	1' 0"	112 11' 2"	7	92 14' 1"
22	24 8' 6"	0' 7"	298 13' 2"	1' 0"	243 57' 1"	8	105 24' 7"
Apr. I	24 7' 9"	0' 8"	297 42' 3"	1' 0"	15 42' 9"	9	118 35' 3"
11	24 7' 1"	0' 7"	297 11' 5"	0' 9"	147 28' 8"	10	131 45' 8"
21	24 6' 4"	0' 8"	296 40' 6"	0' 9"	279 14' 6"		Hours.
May I	24 5' 6"	0' 8"	296 9' 6"	0' 9"	51 0' 4"	I	0 32' 9"
11	24 4' 8"	0' 7"	295 38' 7"	0' 9"	182 46' 3"	2	1 5' 9"
21	24 4' 1"	0' 8"	295 7' 7"	0' 9"	314 32' 1"	3	2 11' 8"
31	24 3' 3"	0' 8"	294 36' 7"	0' 9"	86 17' 9"	4	2 44' 7"
June 10	24 2' 5"	0' 7"	294 5' 7"	0' 8"	218 3' 8"	5	3 17' 6"
20	24 1' 8"	0' 8"	293 34' 7"	0' 8"	349 49' 6"	6	3 50' 6"
30	24 1' 0"	0' 8"	293 3' 8"	0' 7"	121 35' 5"	7	4 23' 5"
July 10	24 0' 2"	0' 8"	292 32' 8"	0' 7"	253 21' 3"	8	4 56' 5"
20	23 59' 4"	0' 8"	292 1' 7"	0' 8"	25 7' 1"	9	5 29' 4"
30	23 58' 6"	0' 8"	291 30' 6"	0' 8"	156 53' 0"	10	6 2' 4"
Aug. 9	23 57' 8"	0' 8"	290 59' 5"	0' 7"	288 38' 8"	11	6 35' 3"
19	23 57' 0"	0' 8"	290 28' 4"	0' 8"	60 24' 6"	12	7 8' 2"
29	23 56' 2"	0' 7"	289 57' 3"	0' 7"	192 10' 5"	13	7 41' 2"
Sept. 8	23 55' 5"	0' 8"	289 26' 2"	0' 7"	323 56' 3"	14	8 14' 1"
18	23 54' 7"	0' 8"	288 55' 1"	0' 6"	95 42' 2"	15	8 47' 1"
28	23 53' 9"	0' 8"	288 24' 0"	0' 7"	227 28' 0"	16	9 20' 0"
Oct. 8	23 53' 1"	0' 8"	287 52' 8"	0' 7"	359 13' 8"	17	9 52' 9"
18	23 52' 3"	0' 9"	287 21' 6"	0' 6"	130 59' 7"	18	10 25' 9"
28	23 51' 4"	0' 8"	286 50' 4"	0' 6"	262 45' 5"	19	10 58' 8"
Nov. 7	23 50' 6"	0' 8"	286 19' 3"	0' 6"	34 31' 3"	20	11 31' 8"
17	23 49' 8"	0' 8"	285 48' 1"	0' 5"	166 17' 2"	21	12 4' 7"
27	23 49' 0"	0' 9"	285 16' 9"	0' 5"	208 3' 0"	22	12 37' 6"
Dec. 7	23 48' 1"	0' 8"	284 45' 6"	0' 5"	69 48' 9"	23	13 10' 6"
17	23 47' 2"	0' 8"	284 14' 3"	0' 5"	201 34' 7"	24	
27	23 46' 4"	-0' 8"	283 42' 9"	-0' 5"	333 20' 5"		Minutes.
37	23 45' 6"	-31' 3"	283 11' 6"	-31' 3"	105 6' 4"		



## MEAN TIME OF HIGH WATER AT LONDON BRIDGE,

Reckoning from Noon of each Day.

Day of the Month	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.	
	h	m	h	m	h	m	h	m	h	m	h	m
1	1	36	14	0	2	59	15	19	2	50	15	44
2	2	23	14	46	3	38	15	54	3	20	15	35
3	3	9	15	31	4	11	16	27	3	49	16	5
4	3	50	16	9	4	43	17	1	4	21	16	37
5	4	28	16	47	5	17	17	33	4	46	17	2
6	5	7	17	26	5	49	18	6	5	31	17	52
7	5	45	18	4	6	24	18	42	6	16	18	43
8	6	23	18	43	7	1	19	22	7	11	19	45
9	7	5	19	28	7	46	20	16	8	23	21	6
10	7	53	20	22	8	53	21	29	9	46	22	25
11	8	56	21	29	10	6	22	46	11	2	23	33
12	10	2	22	35	11	27	—	—	—	12	1	0
13	11	9	23	43	0	1	12	33	0	28	12	52
14	—	12	12	—	1	1	13	25	1	14	13	38
15	0	38	13	0	1	50	14	12	2	2	14	25
16	1	24	13	47	2	33	14	55	2	48	15	12
17	2	9	14	28	3	16	15	37	3	34	15	57
18	2	51	15	12	3	57	16	18	4	18	16	43
19	3	32	15	52	4	39	17	0	5	6	17	30
20	4	14	16	34	5	22	17	44	5	54	18	19
21	4	56	17	19	6	7	18	28	6	47	19	17
22	5	41	18	4	6	52	19	18	7	49	20	24
23	6	28	18	52	7	46	20	19	9	0	21	36
24	7	17	19	45	8	58	21	39	10	9	22	42
25	8	15	20	50	10	23	23	8	11	12	23	40
26	9	27	22	5	11	49	—	—	—	12	6	0
27	10	45	23	25	0	23	12	54	0	30	12	50
28	—	12	1	—	1	19	13	43	1	9	13	27
29	0	35	13	4	—	—	—	—	1	46	14	3
30	1	30	13	54	—	—	—	—	2	19	14	35
31	2	16	14	37	—	—	—	—	2	52	15	10

If the time of High Water be required, according to the *civil* mode of reckoning:

1. *For the Morning Tide* :—With the day of the month *preceding* the given date, take the time opposite thereto from the 2nd column of the month, and diminish it by 12 hours.

2. *For the Afternoon Tide* :—With the given date, take the time opposite thereto from the 1st column of the month.



## MEAN TIME OF HIGH WATER AT LONDON BRIDGE,

Beckoning from Noon of each Day.

Day of the Month	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	h	m	h	m	h	m	h	m	h	m	h	m
1	3	48	16	7	4	54	17	16	6	26	18	55
2	4	27	16	48	5	38	17	59	6	48	19	16
3	5	10	17	32	6	24	18	49	7	46	20	20
4	5	55	18	19	7	15	19	44	9	2	21	47
5	6	46	19	13	8	14	20	48	10	30	23	13
6	7	41	20	13	9	27	22	5	11	51	—	—
7	8	47	21	21	10	42	23	22	0	22	12	52
8	9	54	22	27	11	58	—	—	1	17	13	42
9	11	0	23	33	0	30	13	1	2	2	14	21
10	—	12	6	—	1	29	13	54	2	40	14	58
11	0	36	13	5	2	16	14	38	3	13	15	30
12	1	33	13	59	2	59	15	19	3	46	16	2
13	2	22	14	47	3	38	15	54	4	15	16	29
14	3	10	15	34	4	12	16	30	4	44	17	1
15	3	55	16	15	4	47	17	4	5	16	17	35
16	4	36	16	57	5	20	17	39	5	53	18	17
17	5	17	17	35	5	56	18	13	6	42	19	9
18	5	55	18	17	6	31	18	51	7	45	20	29
19	6	35	18	56	7	11	19	34	8	21	21	4
20	7	19	19	48	8	1	20	38	9	46	22	30
21	8	6	20	36	9	15	21	50	10	36	23	15
22	9	9	21	42	10	29	23	9	11	21	25	56
23	10	13	22	44	11	44	—	—	12	2	—	—
24	11	15	23	47	0	17	12	44	1	46	13	38
25	—	12	17	—	1	10	13	34	2	16	13	38
26	0	45	13	9	1	55	14	15	3	7	15	28
27	1	31	13	53	2	37	14	55	4	20	16	43
28	2	15	14	36	3	14	15	35	5	5	17	31
29	2	56	15	16	3	54	16	14	6	53	18	25
30	3	36	15	55	4	36	16	56	7	57	20	34
31	4	14	16	33	5	18	17	40	—	—	—	—

*Example*.—Required the Mean Time of High Water at London Bridge, for the Morning and Afternoon of July 13, 1870.

1. Opposite the day *preceding*, viz. 12, and in the 2nd column, under JULY, is 13<sup>h</sup> 59<sup>m</sup>, which, being diminished by 12<sup>h</sup>, gives 1<sup>h</sup> 59<sup>m</sup> for the Time of High Water in the Morning.

2. Opposite the given date, and in the 1st column, under JULY, is 2<sup>h</sup> 22<sup>m</sup>, which is the Time of High Water in the Afternoon.



TIME OF HIGH WATER, ON THE FULL AND CHANGE OF THE MOON,  
AT THE UNDERMENTIONED PORTS AND PLACES.

PLACE.	SITUATION.	Time of High Water.	PLACE.	SITUATION.	Time of High Water.
		h m			h m
Aberdeen Bar	Scotland	1 0	Chausey Islands	France	6 9
Aberdovey	Wales	8 0	Cherbourg	France	7 49
Aberystwith	Wales	7 31	Chichester Harbour	England	11 30
Achill-beg	Ireland	5 14	Christchurch Harbour	England	9 0
Agnes (St.)	Scilly Isles	4 30	Clear Cape	Ireland	4 0
Air Point	Isle of Man	11 7	Coquet Road	England	3 0
Aldborough	England	10 45	Cordouan	France	3 37
Alderney Pier	English Channel	6 46	Cork Harbour	Ireland	5 1
Amlwch Port	Anglesea	10 30	Cornwall Cape	England	4 35
Antwerp	Belgium	4 25	Cowes	Isle of Wight	10 45
Arran Isle	Scotland	11 15	Cromarty	Scotland	11 56
Arundel Bar	England	11 35	Cuckolds Point	River Thames	1 45
Ballyshannon Bar	Ireland	5 30	Cuxhaven	Germany	1 8
Balta	Shetland	9 45	Dartmouth Harbour	England	6 16
Baltimore	Ireland	4 23	Deal	England	11 15
Banff	Scotland	0 28	Dee River (Saltney)	England	0 7
Bantry Harbour	Ireland	3 47	Devonport Dock Yard	England	5 43
Bardsey Island	Wales	7 40	Dielette Harbour	France	6 40
Barmouth	Wales	7 40	Dieppe	France	11 6
Barnstaple Bar	England	5 30	Dingle Bay	Ireland	3 51
Beachy Head	England	11 20	Donaghadee Pier	Ireland	11 13
Beaumaris	Wales	10 32	Donegal Bar	Ireland	5 5
Belfast	Ireland	10 43	Douglas Harbour	Isle of Man	11 12
Berwick	England	2 18	Dover Pier	England	11 12
Blakeney Harbour	England	6 30	Downing Bay	Ireland	5 25
Blyth	England	3 15	Sheephaven		
Bolt Head	England	5 45	Downs (Stream)	England	2 30
Bordeaux	France	6 50	Dublin Bar	Ireland	11 12
Boston	England	7 0	Dunbar	Scotland	2 8
Boulogne	France	11 25	Duncansby Head	Scotland	10 14
Brehat Island	France	5 51	Dundalk Bar	Ireland	10 56
Brest Harbour	France	3 47	Dundee	Scotland	2 32
Bridgewater Bar	England	6 50	Dungarvan	Ireland	5 12
Bridlington	England	4 39	Dungeness	England	10 45
Bridport	England	6 5	Dunkerque	France	0 8
Brielle	Holland	3 0	Eddystone	English Chan.	5 25
Brighton	England	11 15	Exmouth Bar	England	6 21
Bristol	England	7 21	Eyemouth	Scotland	2 15
Brouwershaven	Holland	2 15	Falmouth	England	4 57
Burntisland	Scotland	2 24	Fécamp	France	10 44
Caermarthen Bar	Wales	6 10	Flamboro' Head	England	4 30
Caernarvon Bar	Wales	9 33	Flatholm	England	6 54
Calais	France	11 49	Flushing	Holland	1 20
Caldy Island	Coast of Wales	6 0	Fowey	England	5 14
Calf of Man	St. Geo. Channel	11 17	Galloway (Mull)	Scotland	11 15
Cancalle Bay	France	6 20	Galway Bay	Ireland	4 35
Cantyre (Mull)	Scotland	10 35	Glenan Islands	France	3 12
Cardigan Bar	Wales	7 1	Goeree (West Gat.)	Holland	1 45
Carlingford Bar	Ireland	10 40	Granville	France	6 13
Chatham	England	1 2	Gravelines	France	12 0



TIME OF HIGH WATER, ON THE FULL AND CHANGE OF THE MOON,  
AT THE UNDERMENTIONED PORTS AND PLACES.

PLACE.	SITUATION.	Time of High Water.	PLACE.	SITUATION.	Time of High Water.
		h m			h m
Gravesend - -	England - -	1 10	Penzance - - -	England - -	4 30
Greenock - -	W.C.of Scotland	0 8	Peterhead - - -	Scotland - -	0 34
Guernsey Pier -	English Channel	6 48	Portland Race (Stream)	England - -	9 15
Gunfleet Sand -	River Thames	11 40	Portland (Breakwater)	England - -	7 1
Hartlepool - -	England - -	3 28	Port Patrick - - -	Scotland - -	11 10
Harwich - - -	England - -	0 6	Portsmouth Dock Yd.	England - -	11 41
Hastings - - -	England - -	10 53	Ramsgate Harbour -	England - -	11 44
Hàvre de Grace -	France - -	9 51	Rathlin I., Church Bay	N. C. of Irel.	7 56
Helgoland - -	German Ocean	11 33	Rye Bay - - - -	England - -	11 20
Hellevoetsluis -	Holland - -	2 30	Salcombe - - - -	England - -	5 50
Hollesley - - -	England - -	11 30	Saltees - - - -	Ireland - -	5 40
Holyhead - - -	Wales - -	10 11	Scalloway - - - -	Shetland - -	9 30
Holy Island Harb.	England - -	2 30	Scarborough - - -	England - -	4 11
Honfleur Harbour	France - -	9 29	Scilly Islands (St. Mary)	England - -	4 27
Horn Point - -	Jutland - -	1 44	Selsea Bill - - -	England - -	11 45
Howth Harbour -	Ireland - -	11 9	Shannon Mouth - -	Ireland - -	3 50
Hull - - - -	England - -	6 29	Sheerness Dock Yard	England - -	0 37
Humber River Ent.	England - -	5 30	Shields (North) - -	England - -	3 23
Ipswich - - -	England - -	0 35	Shoreham Harbour -	England - -	11 34
Ile de Bas - - -	France - -	4 49	Skerries - - - -	N. C. of Irel.	6 15
Jersey (St. Helier)	English Channel	6 25	Sligo Bay, Mullaghmore	Ireland - -	5 18
Kenmare River -	Ireland - -	3 52	Southampton - - -	England - -	10 30
King Road - - -	Bristol Channel	6 56	Southwold - - - -	England - -	10 20
Kingstown Harb.	Ireland - -	11 10	Spithead (Stream) -	England - -	9 0
Kinsale Harbour	Ireland - -	4 43	Spurn Point - - -	England - -	5 26
Kirkcudbright -	Scotland - -	11 10	St. Helens Road - -	England - -	11 0
La Hougue Harb.	France - -	8 42	St. Ives - - - -	England - -	4 44
Land's End - - -	England - -	4 30	St. Malo - - - -	France - -	6 5
Leith Pier - - -	Scotland - -	2 17	Stromness - - - -	Orkneys - -	9 0
Lerwick Harbour	Shetland - -	10 30	Sunderland - - -	England - -	3 22
Lewis Islands -	Scotland - -	6 0	Swansea Bay - - -	Wales - -	6 10
Liverpool - - -	England - -	11 23	Tay Bar - - - -	Scotland - -	2 6
(St. George Pier)			Tees River Bar - -	England - -	3 45
London Bridge -	River Thames	2 7	Terschelling, West -	Holland - -	8 40
Margate Pier - -	England - -	11 40	Texel, Helder Road } E. Stream - - - }	Holland - -	9 0
Milford Haven Ent.	Wales - -	5 56	Torrey - - - -		
Minehead Pier -	England - -	6 30	Tralee Bay - - -	Ireland - -	4 3
Montrose - - -	Scotland - -	1 25	Tynemouth Bar - -	England - -	3 20
Morlaix - - -	N. C. of France	4 53	Waterford Harbour	Ireland - -	6 6
Needles Point -	Isle of Wight -	9 45	Wexford Harbour -	Ireland - -	7 21
Newcastle - - -	England - -	4 23	Weymouth - - - -	England - -	7 0
Newhaven - - -	England - -	11 51	Whitby - - - -	England - -	3 45
Newport - - -	Wales - -	7 10	Wick - - - -	Scotland - -	11 22
Nieuport - - -	Belgium - -	0 18	Wicklow - - - -	Ireland - -	10 29
Nore Light - -	River Thames	0 30	Wisbeach - - - -	England - -	7 30
Orfordness - -	England - -	11 15	Wranger Oog - - -	E. Friesland	12 0
Ostend - - -	Belgium - -	0 25	Yarmouth Roads -	England - -	9 15
Pembroke Dock Yd.	Wales - -	6 12	Youghal - - - -	Ireland - -	5 14
Pentland Firth -	Scotland - -	11 0			



TABLE, SHOWING THE CORRECTION REQUIRED ON ACCOUNT OF SECOND DIFFERENCES,

In finding the Greenwich Time corresponding to a reduced Lunar Distance.

*Arguments:—Approximate Interval and Difference of Proportional Logarithms.*

Approximate Interval.				Difference of the Proportional Logarithms in the Ephemeris.																											
				2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52		
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
0	10	2	50	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3			
0	20	2	40	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6			
0	30	2	30	0	1	1	2	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	9	9			
0	40	2	20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	11	11			
0	50	2	10	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13			
1	0	2	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14			
1	10	1	50	1	1	2	2	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15			
1	20	1	40	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16			
1	30	1	30	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16			
				Difference of the Proportional Logarithms in the Ephemeris.																											
				54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102			
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s				
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0	10	2	50	4	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	6	7	7	7				
0	20	2	40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	11	11	11	11	12	12	12	12	13				
0	30	2	30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	15	15	16	16	16	17	17	17	18				
0	40	2	20	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	20	20	21	21	22	22				
0	50	2	10	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	23	23	24	24	25	26				
1	0	2	0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28				
1	10	1	50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30				
1	20	1	40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31				
1	30	1	30	17	18	18	19	19	20	21	21	22	23	23	24	24	25	25	26	27	27	28	29	29	30	31	32				
				Difference of the Proportional Logarithms in the Ephemeris.																											
				104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138										
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s				
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0	10	2	50	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9				
0	20	2	40	13	13	13	14	14	14	14	15	15	15	15	15	15	16	16	16	16	16	16	17	17	17	17	17				
0	30	2	30	18	18	19	19	19	20	20	20	21	21	21	21	22	22	22	22	23	23	23	24	24	24	24	24				
0	40	2	20	22	23	23	24	24	25	25	25	26	26	27	27	27	28	28	28	28	29	29	29	30	30	30	30				
0	50	2	10	26	26	27	27	28	29	29	29	30	30	31	31	31	32	32	33	33	33	34	34	34	34	34	34				
1	0	2	0	29	29	30	30	31	31	32	33	33	34	34	35	35	36	37	37	38	38	39	39	38	38	38	38				
1	10	1	50	31	31	32	32	33	34	34	35	35	36	37	37	38	38	39	39	40	40	41	41	40	40	41	41				
1	20	1	40	32	33	33	34	34	35	35	36	37	38	38	39	39	40	40	41	41	41	42	42	41	41	42	42				
1	30	1	30	32	33	34	34	35	35	36	36	37	38	39	39	40	40	41	41	42	42	42	42	42	42	43	43				

The Correction is to be *added* to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are *decreasing*, and *subtracted* when they are *increasing*.



# TABLES.

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$\Delta\lambda$ ,  $\frac{1}{2}$ , and  $B'$ ; USED IN COMPUTING THE MOON'S LIBRATION.

Argument:  $\lambda - \varpi$ .

$\lambda - \varpi$	$\Delta\lambda$	$\frac{1}{2}$	$B'$	—	$\lambda - \varpi$	$\Delta\lambda$	$\frac{1}{2}$	$B'$	—
				diff.					diff.
0	+ 0.0	+ 37	+ 0.0	+ 1.6	45	+ 0.6	+ 53	+ 5.2	+ 1.1
1	0.0	37	0.1	1.6	46	0.6	54	6.3	1.1
2	0.0	37	0.3	1.6	47	0.6	55	7.4	1.1
3	0.1	37	0.4	1.6	48	0.6	56	8.5	1.1
4	0.1	37	0.6	1.6	49	0.6	57	9.6	1.0
5	0.1	37	0.8	1.6	50	0.6	58	10.6	1.0
6	0.1	38	0.9	1.6	51	0.6	59	11.6	1.0
7	0.1	38	0.11	1.6	52	0.6	61	12.6	1.0
8	0.2	38	0.12	1.6	53	0.6	62	13.6	1.0
9	0.2	38	0.14	1.6	54	0.6	63	14.6	0.9
10	0.2	38	0.16	1.6	55	0.6	65	15.5	0.9
11	0.2	38	0.17	1.6	56	0.6	67	16.4	0.9
12	0.3	38	0.19	1.5	57	0.6	69	17.3	0.9
13	0.3	38	0.20	1.6	58	0.6	71	18.2	0.8
14	0.3	38	0.22	1.6	59	0.5	73	19.0	0.8
15	0.3	39	0.23	1.5	60	0.5	75	19.8	0.8
16	0.3	39	0.25	1.6	61	0.5	77	20.6	0.8
17	0.3	39	0.27	1.5	62	0.5	79	21.4	0.7
18	0.4	39	0.28	1.5	63	0.5	82	22.1	0.7
19	0.4	39	0.30	1.5	64	0.5	85	22.8	0.7
20	0.4	40	0.31	1.5	65	0.5	88	23.5	0.7
21	0.4	40	0.33	1.5	66	0.5	92	24.2	0.6
22	0.4	40	0.34	1.5	67	0.4	96	24.8	0.6
23	0.4	41	0.36	1.5	68	0.4	100	25.4	0.6
24	0.5	41	0.37	1.5	69	0.4	104	26.0	0.6
25	0.5	41	0.39	1.5	70	0.4	109	26.6	0.6
26	0.5	41	0.40	1.4	71	0.4	115	27.2	0.5
27	0.5	42	0.41	1.4	72	0.4	121	27.7	0.4
28	0.5	42	0.43	1.4	73	0.3	128	28.1	0.5
29	0.5	43	0.44	1.4	74	0.3	135	28.6	0.4
30	0.5	43	0.46	1.4	75	0.3	144	29.0	0.4
31	0.5	44	0.47	1.4	76	0.3	154	29.4	0.4
32	0.6	44	0.48	1.3	77	0.3	166	29.8	0.3
33	0.6	45	0.50	1.4	78	0.3	180	30.1	0.4
34	0.6	45	0.51	1.3	79	0.2	196	30.5	0.3
35	0.6	46	0.52	1.3	80	0.2	215	30.8	0.2
36	0.6	46	0.54	1.3	81	0.2	239	31.0	0.3
37	0.6	47	0.55	1.3	82	0.2	268	31.3	0.2
38	0.6	47	0.56	1.2	83	0.1	306	31.5	0.1
39	0.6	48	0.58	1.2	84	0.1	357	31.6	0.2
40	0.6	49	0.59	1.3	85	0.1	428	31.8	0.1
41	0.6	49	1.0	1.2	86	0.1	535	31.9	0.1
42	0.6	50	1.1	1.2	87	0.1	713	32.0	0.1
43	0.6	51	1.2	1.2	88	0.0	1069	32.1	0.0
44	0.6	52	1.4	1.1	89	0.0	+2138	32.1	+0.0
45	+ 0.6	+ 53	+ 1.5	+ 1.1	90	+ 0.0	$\infty$	+ 1.32.1	+0.0

\* When  $\lambda - \varpi$  exceeds  $180^\circ$ , take the excess for the Argument, and change the signs of  $\frac{1}{2}$  and  $B'$ .



$\Delta \lambda$ ,  $\frac{1}{\varphi}$ , and  $B'$ ; USED IN COMPUTING THE MOON'S LIBRATION.Argument\*:  $\lambda - \varpi$ .

$\lambda - \varpi$	$\Delta \lambda$	$\frac{1}{\varphi}$	$B'$	$\lambda - \varpi$	$\Delta \lambda$	$\frac{1}{\varphi}$	$B'$
			diff.				diff.
90	0° 0'	$\infty$	+1 32.1	135	0° 6'	53	+1 5.2
91	0° 0'	-2138	1 32.1	136	0° 6'	52	1 4.1
92	0° 0'	1069	1 32.1	137	0° 6'	51	1 2.9
93	0° 1'	713	1 32.0	138	0° 6'	50	1 1.7
94	0° 1'	535	1 31.9	139	0° 6'	49	1 0.5
95	0° 1'	428	1 31.8	140	0° 6'	49	0 59.2
96	0° 1'	357	1 31.6	141	0° 6'	48	0 58.0
97	0° 1'	306	1 31.5	142	0° 6'	47	0 56.8
98	0° 2'	268	1 31.3	143	0° 6'	47	0 55.5
99	0° 2'	239	1 31.0	144	0° 6'	46	0 54.2
100	0° 2'	215	1 30.8	145	0° 6'	46	0 52.9
101	0° 2'	196	1 30.5	146	0° 6'	45	0 51.6
102	0° 3'	180	1 30.1	147	0° 6'	45	0 50.2
103	0° 3'	166	1 29.8	148	0° 6'	44	0 48.9
104	0° 3'	154	1 29.4	149	0° 5'	44	0 47.5
105	0° 3'	144	1 29.0	150	0° 5'	43	0 46.1
106	0° 3'	135	1 28.6	151	0° 5'	43	0 44.7
107	0° 3'	128	1 28.1	152	0° 5'	42	0 43.3
108	0° 4'	121	1 27.7	153	0° 5'	42	0 41.9
109	0° 4'	115	1 27.2	154	0° 5'	41	0 40.5
110	0° 4'	109	1 26.6	155	0° 5'	41	0 39.0
111	0° 4'	104	1 26.0	156	0° 4'	41	0 37.5
112	0° 4'	100	1 25.4	157	0° 4'	41	0 36.0
113	0° 4'	96	1 24.8	158	0° 4'	40	0 34.5
114	0° 5'	92	1 24.2	159	0° 4'	40	0 33.0
115	0° 5'	88	1 23.5	160	0° 4'	40	0 31.5
116	0° 5'	85	1 22.8	161	0° 4'	39	0 30.0
117	0° 5'	82	1 22.1	162	0° 3'	39	0 28.5
118	0° 5'	79	1 21.4	163	0° 3'	39	0 27.0
119	0° 5'	77	1 20.6	164	0° 3'	39	0 25.4
120	0° 5'	75	1 19.8	165	0° 3'	39	0 23.9
121	0° 5'	73	1 19.0	166	0° 3'	38	0 22.3
122	0° 6'	71	1 18.2	167	0° 3'	38	0 20.7
123	0° 6'	69	1 17.3	168	0° 2'	38	0 19.2
124	0° 6'	67	1 16.4	169	0° 2'	38	0 17.6
125	0° 6'	65	1 15.5	170	0° 2'	38	0 16.0
126	0° 6'	63	1 14.6	171	0° 2'	38	0 14.4
127	0° 6'	62	1 13.6	172	0° 2'	38	0 12.8
128	0° 6'	61	1 12.6	173	0° 1'	38	0 11.2
129	0° 6'	59	1 11.6	174	0° 1'	38	0 9.6
130	0° 6'	58	1 10.6	175	0° 1'	37	0 8.0
131	0° 6'	57	1 9.6	176	0° 1'	37	0 6.4
132	0° 6'	56	1 8.5	177	0° 1'	37	0 4.8
133	0° 6'	55	1 7.4	178	0° 0'	37	0 3.2
134	0° 6'	54	1 6.3	179	0° 0'	37	0 1.6
135	-0° 6'	53	+1 5.2	180	-0° 0'	37	+0 0.0

\* When  $\lambda - \varpi$  exceeds  $180^\circ$ , take the excess for the Argument, and change the signs of  $\frac{1}{\varphi}$  and  $B'$ .



## TABLES FOR DETERMINING THE LATITUDE BY OBSERVATIONS OF THE POLE STAR OUT OF THE MERIDIAN.

### TABLE I.

Containing the *First* Correction.

*Argument*:—Sidereal Time of Observation.

Sidereal Time.	Correction.	Sidereal Time.	Sidereal Time.	Correction.	Sidereal Time.
h m	° ' "	h m	h m	° ' "	h m
0 0	— 1 19 3 +	12 0	6 0	— 0 25 18 +	18 0
10	1 20 5	10	10	0 21 50	10
20	1 20 57	20	20	0 18 19	20
30	1 21 41	30	30	0 14 46	30
40	1 22 15	40	40	0 11 12	40
50	1 22 39	50	50	0 7 36	50
1 0	1 22 54	13 0	7 0	0 3 59	19 0
10	1 23 0	10	10	— 0 0 22 +	10
20	1 22 56	20	20	+ 0 3 16 —	20
30	1 22 43	30	30	0 6 52	30
40	1 22 20	40	40	0 10 28	40
50	1 21 48	50	50	0 14 3	50
2 0	1 21 7	14 0	8 0	0 17 37	20 0
10	1 20 16	10	10	0 21 8	10
20	1 19 16	20	20	0 24 37	20
30	1 18 7	30	30	0 28 3	30
40	1 16 49	40	40	0 31 26	40
50	1 15 22	50	50	0 34 45	50
3 0	1 13 47	15 0	9 0	0 38 0	21 0
10	1 12 4	10	10	0 41 11	10
20	1 10 12	20	20	0 44 17	20
30	1 8 12	30	30	0 47 19	30
40	1 6 4	40	40	0 50 14	40
50	1 3 49	50	50	0 53 4	50
4 0	1 1 26	16 0	10 0	0 55 48	22 0
10	0 58 57	10	10	0 58 26	10
20	0 56 20	20	20	1 0 57	20
30	0 53 38	30	30	1 3 21	30
40	0 50 49	40	40	1 5 38	40
50	0 47 54	50	50	1 7 47	50
5 0	0 44 54	17 0	11 0	1 9 48	23 0
10	0 41 49	10	10	1 11 42	10
20	0 38 39	20	20	1 13 27	20
30	0 35 24	30	30	1 15 4	30
40	0 32 6	40	40	1 16 33	40
50	0 28 44	50	50	1 17 52	50
6 0	— 0 25 18 +	18 0	12 0	+ 1 19 3 —	24 0



## TABLES.

TABLE II.

Containing the *Second* Correction. (*always to be added*).  
*Arguments:—Sidereal Time and Altitude.*

Sidereal Time.		Altitude.									Sidereal Time.				
		° 0	° 5	° 10	° 15	° 20	° 25	° 30	° 35						
h	m	'	"	'	"	'	"	'	"	'	"	'	"	h	m
0	0	0	0	0	1	0	1	0	2	0	3	0	3	0	4
	30	0	0	0	0	0	0	0	1	0	1	0	1	0	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2
	30	0	0	0	1	0	1	0	2	0	2	0	3	0	4
3	0	0	0	0	1	0	2	0	3	0	5	0	6	0	7
	30	0	0	0	2	0	3	0	5	0	7	0	9	0	11
4	0	0	0	0	2	0	5	0	7	0	10	0	13	0	16
	30	0	0	0	3	0	6	0	9	0	13	0	16	0	20
5	0	0	0	0	4	0	7	0	11	0	15	0	20	0	25
	30	0	0	0	4	0	9	0	13	0	18	0	23	0	28
6	0	0	0	0	5	0	10	0	15	0	20	0	25	0	31
	30	0	0	0	5	0	10	0	16	0	21	0	27	0	34
7	0	0	0	0	5	0	11	0	16	0	22	0	28	0	35
	30	0	0	0	5	0	11	0	16	0	22	0	28	0	34
8	0	0	0	0	5	0	10	0	15	0	21	0	27	0	33
	30	0	0	0	5	0	9	0	14	0	19	0	25	0	31
9	0	0	0	0	4	0	8	0	13	0	17	0	22	0	27
	30	0	0	0	4	0	7	0	11	0	15	0	19	0	23
10	0	0	0	0	3	0	6	0	9	0	12	0	15	0	19
	30	0	0	0	3	0	4	0	7	0	9	0	12	0	14
11	0	0	0	0	2	0	3	0	5	0	8	0	10	0	12
	30	0	0	0	1	0	2	0	3	0	4	0	5	0	6
12	0	0	0	0	0	0	1	0	1	0	2	0	3	0	3

TABLE III. (*for 1870.*)

Containing the *Third* Correction. (*always to be added*).  
*Arguments:—Sidereal Time and Date.*

Sidereal Time.	Jan. 1.	Feb. 1.	March 1.	April 1.	May 1.	June 1.	July 1.
h	' "	' "	' "	' "	' "	' "	' "
0	1 15	1 12	1 5	0 55	0 47	0 43	0 44
2	1 9	1 11	1 8	1 0	0 51	0 43	0 40
4	1 1	1 8	1 9	1 5	0 57	0 48	0 41
6	0 53	1 2	1 8	1 9	1 4	0 56	0 47
8	0 46	0 56	1 5	1 10	1 10	1 5	0 56
10	0 43	0 51	1 0	1 9	1 14	1 13	1 7
12	0 45	0 48	0 55	1 5	1 13	1 17	1 16
14	0 51	0 49	0 52	1 0	1 9	1 17	1 20
16	0 59	0 52	0 51	0 55	1 3	1 12	1 19
18	1 7	0 58	0 52	0 51	0 56	1 4	1 13
20	1 14	1 4	0 55	0 50	0 50	0 55	1 4
22	1 17	1 9	1 0	0 51	0 46	0 47	0 53
24	1 15	1 12	1 5	0 55	0 47	0 43	0 44



## TABLE II.

Containing the *Second Correction. (always to be added.)*

*Arguments:—Sidereal Time and Altitude.*

Sidereal Time.		Altitude.									Sidereal Time.		
		35°	40°	45°	50°	55°	60°	65°	70°				
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	0	0 4	0 5	0 6	0 7	0 8	0 10	0 12	0 15	12	0	12	0
	30	0 1	0 1	0 2	0 2	0 2	0 3	0 4	0 5			30	30
1	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	13	0	13	0
	30	0 0	0 0	0 0	0 0	0 1	0 1	0 1	0 1			30	30
2	0	0 2	0 2	0 3	0 3	0 4	0 5	0 6	0 7	14	0	14	0
	30	0 5	0 6	0 7	0 8	0 10	0 12	0 15	0 19			30	30
3	0	0 9	0 11	0 13	0 15	0 18	0 22	0 27	0 35	15	0	15	0
	30	0 14	0 16	0 20	0 23	0 28	0 34	0 42	0 54			30	30
4	0	0 19	0 23	0 27	0 32	0 39	0 47	0 58	1 15	16	0	16	0
	30	0 25	0 29	0 35	0 42	0 50	1 1	1 15	1 36			30	30
5	0	0 30	0 36	0 43	0 51	1 1	1 14	1 31	1 57	17	0	17	0
	30	0 34	0 41	0 49	0 59	1 10	1 25	1 45	2 15			30	30
6	0	0 38	0 46	0 55	1 5	1 18	1 34	1 57	2 30	18	0	18	0
	30	0 41	0 49	0 58	1 9	1 23	1 41	2 5	2 40			30	30
7	0	0 42	0 50	1 0	1 11	1 26	1 44	2 9	2 45	19	0	19	0
	30	0 41	0 50	1 0	1 11	1 25	1 43	2 8	2 44			30	30
8	0	0 40	0 48	0 57	1 8	1 22	1 39	2 3	2 38	20	0	20	0
	30	0 37	0 45	0 53	1 3	1 16	1 32	1 54	2 26			30	30
9	0	0 33	0 40	0 48	0 57	1 8	1 22	1 42	2 11	21	0	21	0
	30	0 28	0 34	0 41	0 48	0 58	1 10	1 27	1 52			30	30
10	0	0 23	0 28	0 33	0 39	0 47	0 57	1 11	1 30	22	0	22	0
	30	0 18	0 21	0 25	0 30	0 36	0 43	0 54	1 9			30	30
11	0	0 12	0 15	0 18	0 21	0 25	0 30	0 38	0 48	23	0	23	0
	30	0 8	0 9	0 11	0 13	0 16	0 19	0 23	0 30			30	30
12	0	0 4	0 5	0 6	0 7	0 8	0 10	0 12	0 15	24	0	24	0

## TABLE III. (*for 1870.*)

Containing the *Third Correction. (always to be added.)*

*Arguments:—Sidereal Time and Date.*

Sidereal Time.	July 1.	Aug. 1.	Sept. 1.	Oct. 1.	Nov. 1.	Dec. 1.	Dec. 31.
h	° "	° "	° "	° "	° "	° "	° "
0	0 44	0 51	1 1	1 12	1 24	1 31	1 34
2	0 40	0 41	0 48	0 57	1 9	1 19	1 27
4	0 41	0 37	0 38	0 43	0 52	1 2	1 12
6	0 47	0 39	0 34	0 33	0 37	0 44	0 54
8	0 56	0 46	0 37	0 30	0 28	0 31	0 38
10	1 7	0 57	0 46	0 36	0 28	0 25	0 27
12	1 16	1 9	0 59	0 48	0 36	0 29	0 26
14	1 20	1 19	1 12	1 3	0 51	0 41	0 33
16	1 19	1 23	1 22	1 17	1 8	0 58	0 48
18	1 13	1 21	1 26	1 27	1 23	1 16	1 6
20	1 4	1 14	1 23	1 30	1 32	1 29	1 22
22	0 53	1 3	1 14	1 24	1 32	1 35	1 33
24	0 44	0 51	1 1	1 12	1 24	1 31	1 34



**TABLE**  
For converting INTERVALS of MEAN SOLAR Time into Equivalent INTERVALS  
of SIDEREAL Time.

HOURS.				MINUTES.				SECONDS.											
Hours of Mean Time.	Equivalents in Sidereal Time.			Minutes of Mean Time.	Equivalents in Sidereal Time.			Minutes of Mean Time.	Equivalents in Sidereal Time.			Seconds of Mean Time.	Equivalents in Sidereal Time.			Seconds of Mean Time.	Equivalents in Sidereal Time.		
	h	m	s		m	s		m	s		m	s		s		s			
1	1	0	9.8565	1	1	0.1643	31	31	5.0925	1	1	0.0027	31	31.0849					
2	2	0	19.7130	2	2	0.3286	32	32	5.2568	2	2	0.0055	32	32.0876					
3	3	0	29.5694	3	3	0.4928	33	33	5.4211	3	3	0.0082	33	33.0904					
4	4	0	39.4259	4	4	0.6571	34	34	5.5853	4	4	0.0110	34	34.0931					
5	5	0	49.2824	5	5	0.8214	35	35	5.7496	5	5	0.0137	35	35.0958					
6	6	0	59.1388	6	6	0.9857	36	36	5.9139	6	6	0.0164	36	36.0986					
7	7	1	8.9953	7	7	1.1499	37	37	6.0782	7	7	0.0192	37	37.1013					
8	8	1	18.8518	8	8	1.3142	38	38	6.2424	8	8	0.0219	38	38.1040					
9	9	1	28.7083	9	9	1.4785	39	39	6.4067	9	9	0.0246	39	39.1068					
10	10	1	38.5647	10	10	1.6428	40	40	6.5710	10	10	0.0274	40	40.1095					
11	11	1	48.4212	11	11	1.8070	41	41	6.7353	11	11	0.0301	41	41.1123					
12	12	1	58.2777	12	12	1.9713	42	42	6.8995	12	12	0.0329	42	42.1150					
13	13	2	8.1342	13	13	2.1356	43	43	7.0638	13	13	0.0356	43	43.1177					
14	14	2	17.9906	14	14	2.2998	44	44	7.2281	14	14	0.0383	44	44.1205					
15	15	2	27.8471	15	15	2.4641	45	45	7.3924	15	15	0.0411	45	45.1232					
16	16	2	37.7036	16	16	2.6284	46	46	7.5566	16	16	0.0438	46	46.1259					
17	17	2	47.5600	17	17	2.7927	47	47	7.7209	17	17	0.0465	47	47.1287					
18	18	2	57.4165	18	18	2.9569	48	48	7.8852	18	18	0.0493	48	48.1314					
19	19	3	7.2730	19	19	3.1212	49	49	8.0495	19	19	0.0520	49	49.1342					
20	20	3	17.1295	20	20	3.2855	50	50	8.2137	20	20	0.0548	50	50.1369					
21	21	3	26.9859	21	21	3.4498	51	51	8.3780	21	21	0.0575	51	51.1396					
22	22	3	36.8424	22	22	3.6140	52	52	8.5423	22	22	0.0602	52	52.1424					
23	23	3	46.6989	23	23	3.7783	53	53	8.7066	23	23	0.0630	53	53.1451					
24	24	3	56.5554	24	24	3.9426	54	54	8.8708	24	24	0.0657	54	54.1479					
				25	25	4.1069	55	55	9.0351	25	25	0.0685	55	55.1506					
				26	26	4.2711	56	56	9.1994	26	26	0.0712	56	56.1533					
				27	27	4.4354	57	57	9.3637	27	27	0.0739	57	57.1561					
				28	28	4.5997	58	58	9.5279	28	28	0.0767	58	58.1588					
				29	29	4.7640	59	59	9.6922	29	29	0.0794	59	59.1615					
				30	30	4.9282	60	60	9.8565	30	30	0.0821	60	60.1643					



**TABLE**  
**For converting INTERVALS of MEAN SOLAR Time into Equivalent INTERVALS**  
**of SIDEREAL Time.**

**FRACTIONS OF A SECOND.**

Seconds of Mean Time.	Equivalents in Sidereal Time.	Seconds of Mean Time.	Equivalents in Sidereal Time.	Seconds of Mean Time.	Equivalents in Sidereal Time.
0.01	0.01003	0.34	0.34093	0.67	0.67183
0.02	0.02006	0.35	0.35096	0.68	0.68186
0.03	0.03008	0.36	0.36099	0.69	0.69189
0.04	0.04011	0.37	0.37101	0.70	0.70192
0.05	0.05014	0.38	0.38104	0.71	0.71194
0.06	0.06016	0.39	0.39107	0.72	0.72197
0.07	0.07019	0.40	0.40110	0.73	0.73200
0.08	0.08022	0.41	0.41112	0.74	0.74203
0.09	0.09025	0.42	0.42115	0.75	0.75205
0.10	0.10027	0.43	0.43118	0.76	0.76208
0.11	0.11030	0.44	0.44120	0.77	0.77211
0.12	0.12033	0.45	0.45123	0.78	0.78214
0.13	0.13036	0.46	0.46126	0.79	0.79216
0.14	0.14038	0.47	0.47129	0.80	0.80219
0.15	0.15041	0.48	0.48131	0.81	0.81222
0.16	0.16044	0.49	0.49134	0.82	0.82225
0.17	0.17047	0.50	0.50137	0.83	0.83227
0.18	0.18049	0.51	0.51140	0.84	0.84230
0.19	0.19052	0.52	0.52142	0.85	0.85233
0.20	0.20055	0.53	0.53145	0.86	0.86235
0.21	0.21057	0.54	0.54148	0.87	0.87238
0.22	0.22060	0.55	0.55151	0.88	0.88241
0.23	0.23063	0.56	0.56153	0.89	0.89244
0.24	0.24066	0.57	0.57156	0.90	0.90246
0.25	0.25068	0.58	0.58159	0.91	0.91249
0.26	0.26071	0.59	0.59162	0.92	0.92252
0.27	0.27074	0.60	0.60164	0.93	0.93255
0.28	0.28077	0.61	0.61167	0.94	0.94257
0.29	0.29079	0.62	0.62170	0.95	0.95260
0.30	0.30082	0.63	0.63173	0.96	0.96263
0.31	0.31085	0.64	0.64175	0.97	0.97266
0.32	0.32088	0.65	0.65178	0.98	0.98268
0.33	0.33090	0.66	0.66181	0.99	0.99271

This TABLE is useful for the conversion of MEAN SOLAR into SIDEREAL Time.  
 Sidereal Time required = Sidereal Time at the preceding Mean Noon + the Equivalent to the given Mean Time.

EXAMPLE.—To convert 2<sup>h</sup> 23<sup>m</sup> 25<sup>s</sup>.62 Mean Time at Greenwich, Jan. 7, 1870, into Sidereal Time.

Sidereal Time at the preceding Mean Noon, viz. January 7	7 23.78
For Mean Intervals.	2 <sup>h</sup> 23 <sup>m</sup> 25 <sup>s</sup> .62
The Table gives the Equivalent	3 0 19.713
Sidereal Intervals,	22 3.614
25 0.069	25 0.622
0.622	0.622

The Sum is the Sidereal Time required — 21 30 12.80



## TABLE

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For converting INTERVALS of SIDEREAL TIME into Equivalent INTERVALS of  
MEAN SOLAR Time.

Seconds of Sidereal Time.	Equivalents in Mean Time.	Seconds of Sidereal Time.	Equivalents in Mean Time.	Seconds of Sidereal Time.	Equivalents in Mean Time.
0° 01	0° 00997	0° 34	0° 33907	0° 67	0° 66817
0° 02	0° 01995	0° 35	0° 34904	0° 68	0° 67814
0° 03	0° 02992	0° 36	0° 35902	0° 69	0° 68812
0° 04	0° 03989	0° 37	0° 36899	0° 70	0° 69809
0° 05	0° 04986	0° 38	0° 37896	0° 71	0° 70806
0° 06	0° 05984	0° 39	0° 38894	0° 72	0° 71803
0° 07	0° 06981	0° 40	0° 39891	0° 73	0° 72801
0° 08	0° 07978	0° 41	0° 40888	0° 74	0° 73798
0° 09	0° 08975	0° 42	0° 41885	0° 75	0° 74795
0° 10	0° 09973	0° 43	0° 42883	0° 76	0° 75793
0° 11	0° 10970	0° 44	0° 43880	0° 77	0° 76790
0° 12	0° 11967	0° 45	0° 44877	0° 78	0° 77787
0° 13	0° 12965	0° 46	0° 45874	0° 79	0° 78784
0° 14	0° 13962	0° 47	0° 46872	0° 80	0° 79782
0° 15	0° 14959	0° 48	0° 47869	0° 81	0° 80779
0° 16	0° 15956	0° 49	0° 48866	0° 82	0° 81776
0° 17	0° 16954	0° 50	0° 49864	0° 83	0° 82773
0° 18	0° 17951	0° 51	0° 50861	0° 84	0° 83771
0° 19	0° 18948	0° 52	0° 51858	0° 85	0° 84768
0° 20	0° 19945	0° 53	0° 52855	0° 86	0° 85765
0° 21	0° 20943	0° 54	0° 53853	0° 87	0° 86762
0° 22	0° 21940	0° 55	0° 54850	0° 88	0° 87760
0° 23	0° 22937	0° 56	0° 55847	0° 89	0° 88757
0° 24	0° 23934	0° 57	0° 56844	0° 90	0° 89754
0° 25	0° 24932	0° 58	0° 57842	0° 91	0° 90752
0° 26	0° 25929	0° 59	0° 58839	0° 92	0° 91749
0° 27	0° 26926	0° 60	0° 59836	0° 93	0° 92746
0° 28	0° 27924	0° 61	0° 60833	0° 94	0° 93743
0° 29	0° 28921	0° 62	0° 61831	0° 95	0° 94741
0° 30	0° 29918	0° 63	0° 62828	0° 96	0° 95738
0° 31	0° 30915	0° 64	0° 63825	0° 97	0° 96735
0° 32	0° 31913	0° 65	0° 64823	0° 98	0° 97732
0° 33	0° 32910	0° 66	0° 65820	0° 99	0° 98730

**THIS TABLE** is useful for the conversion of SIDEREAL into MEAN SOLAR TIME.  
Mean Solar Time required = Mean Time at the *preceding* Sidereal Noon + the Equivalent to the *given* Sidereal Time.  
**EXAMPLE.**—To convert 21<sup>h</sup> 30<sup>m</sup> 13<sup>s</sup>.80 Sidereal Time at Greenwich, Jan. 7, 1870, into Mean Time.

Mean Time at the preceding Sidereal Noon, viz. ----- January 6. - - - - - 4<sup>h</sup> 55<sup>m</sup> 44<sup>s</sup> 19

For Sidereal Intervals.	30 0	} The Table gives the Equivalent Mean Intervals,	20 56 33 579
	12		29 35 585
	0 80		11 067 0 798

The Sum is the Mean Time required, Jan. 7. - 22 22 25 62



LATITUDES AND LONGITUDES OF PUBLIC OBSERVATORIES.

\* \* \* The Longitudes are reckoned from the Meridian of Greenwich.

ALBANY, U. S. - - -	(Dudley Observatory.) Lat. $42^{\circ} 39' 49'' \cdot 55$ N. } <i>Brünnow's Astron. Notices,</i> Long. $4^h 54^m 59^s \cdot 52$ W. } vol. i. pages 139 and 160.
ALTONA - - - - -	Lat. $53^{\circ} 32' 45'' \cdot 3$ N. <i>Gauss on the Latitudes of Göttingen and Altona</i> , page 71. (Göttingen, 1828.) Long. $0^h 39^m 46^s \cdot 14$ E. <i>Expédition Chronométrique exécutée entre Altona et Greenwich, &amp;c.</i> (St. Petersburg, 1845.)
ANN-ARBOR - - - -	(Michigan.) Lat. $42^{\circ} 16' 48''$ N. } <i>Astronomical Journal</i> , vol. v. Long. $5^h 35^m 24^s$ W. } page 112.
ARMAGH - - - - -	Lat. $54^{\circ} 21' 12'' \cdot 7$ N. } Communicated by the Rev. Dr. Long. $0^h 26^m 35^s \cdot 5$ W. } Robinson.
ATHENS - - - - -	Lat. $37^{\circ} 58' 20''$ N. <i>Ast. Nach.</i> vol. xxxiii. page 197. Long. $1^h 34^m 55^s \cdot 7$ E. <i>Ergänzungs-Heft zu den Ast. Nach.</i> 1849, page 151.
BERLIN - - - - -	Lat. $52^{\circ} 30' 16'' \cdot 7$ N. } <i>Berliner Astron. Jahrbuch</i> , 1852, Long. $0^h 53^m 35^s \cdot 5$ E. } page 289.
BILK - - - - -	Lat. $51^{\circ} 12' 25''$ N. } <i>Ast. Nach.</i> vol. xxvii. page 300. Long. $0^h 27^m 5^s \cdot 5$ E. }
BOLOGNA - - - - -	Lat. $44^{\circ} 29' 47''$ N. } <i>Conn. des Temps</i> , 1861, p. xxxii. Long. $0^h 45^m 24^s \cdot 53$ E. }
BONN - - - - -	Lat. $50^{\circ} 44' 9'' \cdot 1$ N. } <i>Ast. Nach.</i> vol. xviii. page 135. Long. $0^h 28^m 27^s \cdot 0$ E. }
BRESLAU - - - - -	Lat. $51^{\circ} 6' 56'' \cdot 0$ N. } <i>Berliner Astron. Jahrbuch</i> , 1852, Long. $1^h 8^m 10^s \cdot 0$ E. } page 289.
BRUSSELS - - - - -	Lat. $50^{\circ} 51' 10'' \cdot 7$ N. <i>Annuaire de l'Observatoire de Bruxelles, pour l'An 1837</i> , pages 264 and 265. Long. $0^h 17^m 28^s \cdot 90$ E. Communicated by G. B. Airy, Esq.
BUDA - - - - -	(Ofen.) Lat. $47^{\circ} 29' 12'' \cdot 2$ N. <i>Mem. Ast. Soc.</i> vol. i. page 280. Long. $1^h 16^m 12^s \cdot 7$ E. <i>Zach's Correspond. Astron.</i> vol. vii. page 263.
CAMBRIDGE - - - -	Lat. $52^{\circ} 12' 51'' \cdot 6$ N. <i>Cambridge Observations</i> , 1838. Long. $0^h 0^m 22^s \cdot 75$ E. <i>Camb. Phil. Trans.</i> vol. ix. partiv.
CAMBRIDGE, U. S. -	Lat. $42^{\circ} 22' 49''$ N. } <i>Monthly Notices of the Royal Ast. Soc.</i> vol. vii. page 157. Long. $4^h 44^m 32^s$ W. }



## LATITUDES AND LONGITUDES OF PUBLIC OBSERVATORIES.

CAPE OF GOOD HOPE	- Lat. $33^{\circ} 56' 3''$ S.	<i>Mem. Roy. Ast. Soc.</i> vol. vi. page 130.
	Long. $1^{\text{h}} 13^{\text{m}} 55^{\text{s}} \cdot 0$ E.	Communicated by Mr. Henderson.
CHRISTIANIA	- - - Lat. $59^{\circ} 54' 42'' \cdot 4$ N.	<i>Ast. Nach.</i> vol. xii. page 283.
	Long. $0^{\text{h}} 42^{\text{m}} 53^{\text{s}} \cdot 9$ E.	<i>Berliner Astron. Jahrbuch</i> , 1852, page 289.
COPENHAGEN	- - - (University.)	
	Lat. $55^{\circ} 40' 53'' \cdot 0$ N.	<i>Ast. Nach.</i> vol. v. page 366.
	Long. $0^{\text{h}} 50^{\text{m}} 19^{\text{s}} \cdot 8$ E.	<i>Ast. Nach.</i> vol. xix. page 120.
CRACOW	- - - Lat. $50^{\circ} 3' 50'' \cdot 0$ N.	<i>Ast. Nach.</i> vol. xvi. page 256.
	Long. $1^{\text{h}} 19^{\text{m}} 51^{\text{s}} \cdot 1$ E.	<i>Ast. Nach.</i> vol. xvi. page 352; and vol. xviii. page 392.
DORPAT	- - - Lat. $58^{\circ} 22' 47'' \cdot 1$ N.	<i>Struve's Astronom. Observations</i> , vol. vi. page 60.
	Long. $1^{\text{h}} 46^{\text{m}} 53^{\text{s}} \cdot 56$ E.	Communicated by Mr. Struve to the Astronomer Royal.
DUBLIN	- - - Lat. $53^{\circ} 23' 13''$ N.	} <i>Ast. Nach.</i> vol. x. page 274.
	Long. $0^{\text{h}} 25^{\text{m}} 22^{\text{s}}$ W.	
DURHAM	- - - Lat. $54^{\circ} 46' 6'' \cdot 2$ N.	} Communicated by Professor Chevallier.
	Long. $0^{\text{h}} 6^{\text{m}} 19^{\text{s}} \cdot 75$ W.	
EDINBURGH	- - - Lat. $55^{\circ} 57' 23'' \cdot 2$ N.	<i>Ast. Soc. Not.</i> vol. iii. page 201.
	Long. $0^{\text{h}} 12^{\text{m}} 43^{\text{s}} \cdot 6$ W.	<i>Mem. Ast. Soc.</i> vol. iv. page 568.
FLORENCE	- - - (Musée Royal.)	
	Lat. $43^{\circ} 46' 4'' \cdot 1$ N.	} Communicated by Dr. Donati.
	Long. $0^{\text{h}} 45^{\text{m}} 1^{\text{s}} \cdot 46$ E.	
GENEVA	- - - Lat. $46^{\circ} 11' 59'' \cdot 4$ N.	<i>Mémoire sur une nouvelle détermination sur la Latitude de Genève.</i> By M. Gautier. (Genève, 1830.)
	Long. $0^{\text{h}} 24^{\text{m}} 37^{\text{s}} \cdot 7$ E.	<i>Ast. Nach.</i> vol. xx. page 7.
GEORGETOWN COLLEGE, D.C. (U.S.)		
	Lat. $38^{\circ} 54' 26'' \cdot 1$ N.	} <i>Annals of the Astronomical Observatory of Georgetown College</i> , D.C. No. I. pages 215 and 186.
	Long. $5^{\text{h}} 8^{\text{m}} 18^{\text{s}} \cdot 15$ W.	
GLASGOW	- - - Lat. $55^{\circ} 52' 42'' \cdot 84$ N.	} Communicated by Professor Grant.
	Long. $0^{\text{h}} 17^{\text{m}} 10^{\text{s}} \cdot 55$ W.	
GOTHA	- - - (Seeberg.)	
	Lat. $50^{\circ} 56' 5''$ N.	<i>Gauss on the Latitudes of Göttingen and Altona</i> , page 80.
	Long. $0^{\text{h}} 42^{\text{m}} 56^{\text{s}} \cdot 4$ E.	<i>Bessel's Tabula Regiomontana</i> , page 2.



## LATITUDES AND LONGITUDES OF PUBLIC OBSERVATORIES.

GÖTTINGEN - - -	Lat. $51^{\circ} 31' 48''$ N.	<i>Gauss on the Latitudes of Göttingen and Altona</i> , page 71.
	Long. $0^h 39^m 46^s \cdot 5$ E.	<i>Bessel's Tabula Regiomontanae</i> , page 2.
GREENWICH - - -	Lat. $51^{\circ} 28' 38'' \cdot 0$ N.	Communicated by G. B. Airy, Esq.
	Long. $0^h 0^m 0^s$	
HAMBURGH - - -	Lat. $53^{\circ} 33' 5'' \cdot 0$ N.	<i>Ast. Nach.</i> vol. vii. page 379.
	Long. $0^h 39^m 54^s \cdot 1$ E.	<i>Berliner Astron. Jahrbuch</i> , 1852, page 289.
HAMILTON COLLEGE, N.Y. (U.S.) - - -	{ Lat. $43^{\circ} 3' 16'' \cdot 5$ N. Long. $5^h 1^m 37^s \cdot 12$ W. }	Communicated by Dr. C. H. F. Peters.
HELSINGFORS - - -	{ Lat. $60^{\circ} 9' 42'' \cdot 3$ N. Long. $1^h 39^m 50^s \cdot 9$ E. }	<i>Berliner Astron. Jahrbuch</i> , 1865, page 287.
KAZAN - - -	{ Lat. $55^{\circ} 47' 23'' \cdot 1$ N. Long. $3^h 16^m 26^s \cdot 3$ E. }	<i>Ast. Nach.</i> vol. xxviii. page 47. <i>Conn. des Temps</i> , 1855, p. 376.
KÖNIGSBERG - - -	{ Lat. $54^{\circ} 42' 50'' \cdot 7$ N. Long. $1^h 22^m 0^s \cdot 5$ E. }	<i>Ast. Nach.</i> vol. xxix. p. 72. <i>Bessel's Tab. Regiomontanae</i> , p. 2.
KREMSMÜNSTER - - -	{ Lat. $48^{\circ} 3' 23'' \cdot 8$ N. Long. $0^h 56^m 32^s \cdot 8$ E. }	<i>Ast. Nach.</i> vol. xxxvii. page 271. <i>Ast. Nach.</i> vol. xxxvii. page 269.
LEIPSIQ - - -	{ Lat. $51^{\circ} 20' 9'' \cdot 8$ N. Long. $0^h 49^m 33^s \cdot 6$ E. }	<i>Geschichte und Beschreibung der Leipziger Sternwarte</i> von Dr. C. Bruhns, p. 19.
LEYDEN - - -	{ Lat. $52^{\circ} 9' 28'' \cdot 2$ N. Long. $0^h 17^m 57^s \cdot 5$ E. }	<i>Ast. Nach.</i> vol. xvii. page 100.
LIVERPOOL - - -	{ Lat. $53^{\circ} 24' 47'' \cdot 8$ N. Long. $0^h 12^m 0^s \cdot 11$ W. }	Communicated by J. Hartnup, Esq. G. B. Airy, Esq.
MADRAS - - -	{ Lat. $13^{\circ} 4' 8'' \cdot 1$ N. Long. $5^h 20^m 57^s \cdot 3$ E. }	Communicated by Captain W. S. Jacob.
MADRID - - -	{ Lat. $40^{\circ} 24' 29'' \cdot 7$ N. Long. $0^h 14^m 45^s \cdot 40$ W. }	Communicated by Señor Antonio Aguilar.
MANHEIM - - -	{ Lat. $49^{\circ} 29' 14''$ N. Long. $0^h 33^m 51^s \cdot 4$ E. }	<i>Zach's Correspond. Astron.</i> vol. i. page 193. <i>Ast. Nach.</i> vol. ii. page 398.
MARBURG - - -	{ Lat. $50^{\circ} 48' 46'' \cdot 9$ N. Long. $0^h 35^m 5^s \cdot 6$ E. }	<i>Ast. Nach.</i> vol. xx. page 27.
MARSEILLES - - -	{ Lat. $43^{\circ} 17' 50'' \cdot 1$ N. Long. $0^h 21^m 29^s \cdot 0$ E. }	<i>Zach's Attraction des Montagnes</i> , vol. ii. page 591. <i>Ast. Nach.</i> vol. iv. page 36.



## LATITUDES AND LONGITUDES OF PUBLIC OBSERVATORIES.

MELBOURNE	- - -	(New Observatory.)		
		Lat. $37^{\circ} 49' 53'' \cdot 4$ S.	} Communicated by R. J. Ellery, Esq.	
		Long. $9^{\text{h}} 39^{\text{m}} 54^{\text{s}} \cdot 8$ E.		
MILAN	- - - -	(Brera.)		
		Lat. $45^{\circ} 28' 1''$ N.	} <i>Zach's Correspond. Astron.</i> vol. v. page 300.	
		Long. $0^{\text{h}} 36^{\text{m}} 47^{\text{s}} \cdot 2$ E.		<i>Ast. Nach.</i> vol. ix. page 312.
MODENA	- - - -	Lat. $44^{\circ} 38' 53''$ N.	} <i>Effem. Astron. di Milano</i> for 1829, pages 94 and 60.	
		Long. $0^{\text{h}} 43^{\text{m}} 43^{\text{s}} \cdot 2$ E.		
MOSCOW	- - - -	Lat. $55^{\circ} 45' 19'' \cdot 8$ N.	} <i>Ast. Nach.</i> vol. xxvii. page 215.	
		Long. $2^{\text{h}} 30^{\text{m}} 16^{\text{s}} \cdot 96$ E.		
MUNICH	- - - -	(Bogenhausen.)		
		Lat. $48^{\circ} 8' 45''$ N.	} <i>Ast. Nach.</i> vol. i. page 221.	
		Long. $0^{\text{h}} 46^{\text{m}} 26^{\text{s}} \cdot 5$ E.		<i>Ast. Nach.</i> vol. viii. page 148.
NAPLES	- - - -	(Capo di Monte.)		
		Lat. $40^{\circ} 51' 46'' \cdot 6$ N.	} <i>Ast. Nach.</i> vol. v. page 294.	
		Long. $0^{\text{h}} 56^{\text{m}} 58^{\text{s}} \cdot 86$ E.		Communicated by Professor Ragona.
NICOLÆFF	- - - -	Lat. $46^{\circ} 58' 20'' \cdot 6$ N.	} <i>Ast. Nach.</i> vol. vii. page 261.	
		Long. $2^{\text{h}} 7^{\text{m}} 55^{\text{s}} \cdot 1$ E.		<i>Ast. Nach.</i> vol. vii. page 306.
OXFORD	- - - -	Lat. $51^{\circ} 45' 36'' \cdot 0$ N.	} Communicated by M. J. Johnson, Esq.	
		Long. $0^{\text{h}} 5^{\text{m}} 2^{\text{s}} \cdot 6$ W.		
PADUA	- - - -	Lat. $45^{\circ} 24' 2''$ N.	} <i>Ast. Nach.</i> vol. v. page 411.	
		Long. $0^{\text{h}} 47^{\text{m}} 29^{\text{s}} \cdot 2$ E.		<i>Ast. Nach.</i> vol. iv. page 347.
PALERMO	- - - -	Lat. $38^{\circ} 6' 44''$ N.	} <i>Cacciatore</i> , in Books 7 and 8 of <i>Palermo Observations</i> .	
		Long. $0^{\text{h}} 53^{\text{m}} 24^{\text{s}} \cdot 17$ E.		Communicated by Professor Ragona.
PARIS	- - - -	Lat. $48^{\circ} 50' 13''$ N.	} <i>Conn. des Temps</i> , 1853, page 353.	
		Long. $0^{\text{h}} 9^{\text{m}} 20^{\text{s}} \cdot 63$ E.		Communicated by G. B. Airy, Esq.
PETERSBURG	- - -	(Academy of Sciences.)		
		Lat. $59^{\circ} 56' 29'' \cdot 7$ N.	} <i>Description de l'Observatoire As-</i> <i>tron. Central de Poulkova</i> , p. 292.	
		Long. $2^{\text{h}} 1^{\text{m}} 13^{\text{s}} \cdot 5$ E.		
PORTSMOUTH	- - -	Lat. $50^{\circ} 48' 3''$ N.	} <i>Requisite Tables</i> , 3rd edit. (from Trig. Survey.)	
		Long. $0^{\text{h}} 4^{\text{m}} 23^{\text{s}} \cdot 9$ W.		
PRAGUE	- - - -	Lat. $50^{\circ} 5' 18'' \cdot 5$ N.	} <i>Ast. Nach.</i> vol. viii. page 198.	
		Long. $0^{\text{h}} 57^{\text{m}} 41^{\text{s}} \cdot 9$ E.		<i>Ast. Nach.</i> vol. iii. page 264.
PULKOWA	- - - -	Lat. $59^{\circ} 46' 18'' \cdot 7$ N.	} <i>Description de l'Observatoire As-</i> <i>tron. Central de Poulkova</i> , p. 290.	
		Long. $2^{\text{h}} 1^{\text{m}} 18^{\text{s}} \cdot 66$ E.		



## LATITUDES AND LONGITUDES OF PUBLIC OBSERVATORIES.

QUEBEC - - - - -	Lat. $46^{\circ} 48' 30''$ N. Long. $4^h 44^m 49^s.02$ W. }	Communicated by Lieutenant Ashe, R. N.
RIO DE JANEIRO - - -	Lat. $22^{\circ} 53' 51''.0$ S. Long. $2^h 52^m 14^s.59$ W. }	Communicated by Lieutenant G. L. Tupman, R. M. Artillery.
ROME - - - - -	(Roman College.) Lat. $41^{\circ} 53' 52''.2$ N. Long. $0^h 49^m 54^s.7$ E. }	<i>Mem. dell' Osserv. dell' Università Gregoriana del Collegio Romano</i> , 1851, page 17.
ST. FERNANDO, near CADIZ - - - - -	{ Lat. $36^{\circ} 27' 45''$ N. Long. $0^h 24^m 49^s.1$ W. }	<i>Zach's Corresp. Astron.</i> vol. xiv. pages 240-243. <i>Ast. Nach.</i> vol. ix. page 358.
SANTIAGO DE CHILE - -	(National Observatory.) Lat. $33^{\circ} 26' 25''.4$ S. Long. $4^h 42^m 32^s.97$ W. }	<i>Observaciones Astronómicas, &amp;c. de Santiago de Chile.</i> Tomo I.
STOCKHOLM - - - - -	Lat. $59^{\circ} 20' 31''.0$ N. Long. $1^h 12^m 14^s.8$ E. }	<i>Conn. des Temps</i> , 1840, page 344. <i>Ast. Nach.</i> vol. xi. page 408.
SYDNEY - - - - -	Lat. $33^{\circ} 51' 41''.1$ S. Long. $10^h 4^m 59^s.86$ E. }	Communicated by W. Scott, Esq.
TURIN - - - - -	(New Observatory.) Lat. $45^{\circ} 4' 6''$ N. Long. $0^h 30^m 48^s.4$ E. }	Communicated by M. Plana to Captain B. Hall, R.N.
UPSALA - - - - -	(New Observatory.) Lat. $59^{\circ} 51' 31''.5$ N. Long. $1^h 10^m 30^s$ E. }	Communicated by Dr. Thalén.
UTRECHT - - - - -	Lat. $52^{\circ} 5' 10''.5$ N. Long. $0^h 20^m 31^s.3$ E. }	Communicated by M. Hoek.
VENICE - - - - -	Lat. $45^{\circ} 25' 49''.5$ N. Long. $0^h 49^m 25^s.4$ E. }	<i>Berliner Astron. Jahrbuch</i> , 1852, page 290.
VIENNA - - - - -	Lat. $48^{\circ} 12' 35''$ N. Long. $1^h 5^m 31^s.9$ E. }	<i>Littrow's Astron. Observations</i> , Part viii. page 124. <i>Ast. Nach.</i> vol. iii. page 64.
WARSAW - - - - -	Lat. $52^{\circ} 13' 5''.0$ N. Long. $1^h 24^m 8^s.5$ E. }	<i>Additions to Conn. des Temps</i> , 1846, pages 30, 31.
WASHINGTON - - - -	(National Observatory.) Lat. $38^{\circ} 53' 38''.6$ N. Long. $5^h 8^m 12^s.0$ W. }	<i>Roy. Ast. Soc. Monthly Notices</i> , vol. x. page 180.
WILNA - - - - -	Lat. $54^{\circ} 41' 0''$ N. Long. $1^h 41^m 11^s.9$ E. }	<i>Ast. Nach.</i> vol. iv. page 562. <i>Ast. Nach.</i> vol. viii. page 96.



## LATITUDES AND LONGITUDES OF PRIVATE OBSERVATORIES.

BIRK CASTLE - - -	(The Earl of Rosse.)				
	Lat. $53^{\circ} 5' 47''$	N. }	Communicated by the Earl of		
	Long. $0^h 31^m 40^s \cdot 9$	W. }	Rosse.		
BRADSTONES - - -	(W. Lassell, Esq.)				
(LIVERPOOL.)	Lat. $53^{\circ} 25' 28''$	N. }	Communicated by W. Lassell,		
	Long. $0^h 11^m 38^s \cdot 7$	W. }	Esq.		
CARDINGTON - - -	(S. C. Whitbread, Esq.)				
(NEAR BEDFORD.)	Lat. $52^{\circ} 6' 25''$	N. }	Communicated by S. C. Whit-		
	Long. $0^h 1^m 39^s$	W. }	bread, Esq.		
CRANFORD - - -	(Warren De la Rue, Esq.)				
	Lat. $51^{\circ} 28' 59'' \cdot 5$	N. }	Communicated by Warren		
	Long. $0^h 1^m 37^s \cdot 68$	W. }	De la Rue, Esq.		
HADDENHAM - - -	(Rev. W. R. Dawes.)				
(BUCKS.)	Lat. $51^{\circ} 45' 54''$	N. }	Communicated by the Rev.		
	Long. $0^h 3^m 43^s \cdot 4$	W. }	W. R. Dawes.		
HARTWELL - - -	(Dr. Lee.)				
	Lat. $51^{\circ} 48' 36''$	N. }	Communicated by Dr. Lee.		
	Long. $0^h 3^m 24^s \cdot 33$	W. }			
HAVERHILL - - -	(W. W. Boreham, Esq.)				
	Lat. $52^{\circ} 5' 22'' \cdot 8$	N. }	Communicated by W. W. Bore-		
	Long. $0^h 1^m 46^s \cdot 4$	E. }	ham, Esq.		
JOSEPHSTADT - - -	(Herr Theodore Oppolzer.)				
(VIENNA.)	Lat. $48^{\circ} 12' 55''$	N. }	Communicated by Herr T.		
	Long. $1^h 5^m 25^s \cdot 5$	E. }	Oppolzer.		
KENSINGTON - - -	(Sir James South.)				
	Lat. $51^{\circ} 30' 11'' \cdot 6$	N. }	Communicated by Sir James		
	Long. $0^h 0^m 46^s \cdot 8$	W. }	South.		
LEYTON - - - -	(J. Gurney Barclay, Esq.)				
	Lat. $51^{\circ} 34' 34''$	N. }	Communicated by J. Gurney		
	Long. $0^h 0^m 0^s \cdot 87$	W. }	Barclay, Esq.		
TARN BANK - - -	(Isaac Fletcher, Esq.)				
	Lat. $54^{\circ} 39' 13'' \cdot 7$	N. }	Communicated by Isaac		
	Long. $0^h 13^m 44^s \cdot 52$	W. }	Fletcher, Esq.		



## LATITUDES AND LONGITUDES OF PRIVATE OBSERVATORIES.

TWICKENHAM - - -	(George Bishop, Esq.)	
	Lat. $51^{\circ} 27' 4'' \cdot 2$ N.	} Communicated by Lieut.-Col. Sir Henry James.
	Long. $0^h 1^m 13^s \cdot 10$ W.	
WINDSOR, N.S.W.	- (J. Tebbutt, Junr., Esq.)	
	Lat. $33^{\circ} 36' 30''$ S.	} <i>Roy. Ast. Soc. Monthly Notices</i> , vol. xxv. page 45.
	Long. $10^h 3^m 20^s$ E.	
WROTTESLEY HALL -	(Lord Wrottesley.)	
	Lat. $52^{\circ} 37' 2'' \cdot 3$ N.	} Communicated by Lord Wrottesley.
	Long. $0^h 8^m 53^s \cdot 57$ W.	



## EXPLANATION OF THE ARTICLES

CONTAINED IN

THE NAUTICAL ALMANAC AND ASTRONOMICAL EPHEMERIS  
FOR THE YEAR 1870.

ALL the articles of the Ephemeris have been computed for Greenwich MEAN solar time ; and where they are given for apparent solar or sidereal time, it has been chiefly for the convenience of astronomers. A *day* is the interval of time between the departure of any meridian from a heavenly body and its succeeding return to it, and derives its name from the body with which the motion of the meridian is compared. The interval between the departure and return of a meridian to the Sun is called a *solar day* ; in the case of the Moon, the interval is called a *lunar day* ; and in that of a Star, a *sidereal day*. The revolution of the Earth on its axis is always performed in the same time ; and if the heavenly bodies preserved the same positions with respect to each other, the intervals between the departure and return of a meridian to each would be the same, and all days, consequently, of equal length. The Sun, (or more strictly, the Earth in its orbit,) the Moon, and the Planets are, however, in continual motion ; and with velocities not only different from each other, but varying in each particular body : the length of a day, as determined by any of these bodies, is therefore a variable quantity.

Astronomers, with a view of obtaining a convenient and uniform measure of time, have recourse to a *mean solar day*, the length of which is equal to the mean or average of all the apparent solar days in a year. An imaginary Sun, called the *mean Sun*, is conceived to move uniformly in the Equator with the real Sun's *mean* motion in Right Ascension, and the interval between the departure of any meridian from the *mean Sun* and its succeeding return to it is the duration of the *mean solar day*. Clocks and chronometers are adjusted to mean solar time ; so that a complete revolution (through 24 hours) of the hour hand of one of these machines should be performed in exactly the same interval as the revolution of the Earth on its axis with respect to the mean Sun. If the mean Sun could be observed on the meridian at the instant that the clock indicated 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>, it would again be observed there when the hour hand returned to the same position. As the time deduced from observation of the *true Sun* is called *true* or *apparent* time, so the time deduced from the *mean Sun*, or indicated by the machines which represent its motion, is denominated *mean* time.

We cannot *immediately* obtain mean time from observation ; but, from an observation of the true Sun, with the aid of the equation of time, which is the angular distance in time between the mean and the true Sun, we may readily deduce it. Suppose the true Sun to be observed on the meridian of Greenwich, Jan. 1, 1870 ; it would then be apparent noon at that meridian ; the equation of time at this instant is 3<sup>m</sup> 51<sup>s</sup> 40, and, by the precept at the head of the column, it is "*to be added to*



*apparent time*"; hence it appears that the corresponding mean time is Jan. 1, 0<sup>h</sup> 3<sup>m</sup> 51<sup>s</sup> 40, or that the mean Sun had passed the meridian previously to the true Sun, and that at the instant of observation the mean time clock ought to indicate this time.

A mere inspection of the columns of the Ephemeris is, of itself, sufficient to show that the quantities are continually varying, and that some reduction is necessary where data are to be obtained for any time differing from that for which the quantities are registered. Take, for instance, the Sun's Right Ascension on Page II. of the month of January; on January 1, it is 18<sup>h</sup> 47<sup>m</sup> 35<sup>s</sup> 76; on January 2, it is 18<sup>h</sup> 52<sup>m</sup> 0<sup>s</sup> 59; in the course of 24 mean hours it has therefore increased by 4<sup>m</sup> 24<sup>s</sup> 83. If, then, the Right Ascension were required for any time between January 1 and January 2, as at January 1, 6<sup>h</sup>, it would be necessary to increase the Right Ascension on January 1, by the proportional part of the daily increase due for the 6<sup>h</sup>, viz. by one-fourth part, or 1<sup>m</sup> 6<sup>s</sup> 21. This would in all cases be required, even under the meridian of Greenwich, for which the quantities have been specially computed. Let a person be now supposed to be under a meridian 15° West of Greenwich. The positions of the heavenly bodies, as referred to the centre of the Earth, are independent of meridians, and are the same for all places at the same absolute instant; but the relative times at Greenwich and the assumed meridian would be different. If it were 1<sup>h</sup> from mean noon at the one place, it could not be 1<sup>h</sup> from mean noon at the other; for when we speak of time, we mean, as regards a visible phenomenon, the distance of the Sun *westward* from a given meridian, and at the same absolute moment of time the Sun *cannot* be at the same distance (*reckoning westward*) from two meridians which are 15° distant from each other. Before we can make use of the Ephemeris, it is therefore necessary to ascertain, in every instance, the distance of the Sun (*in time*) from the meridian of Greenwich, or what is commonly called the corresponding Greenwich time; and this is evidently equal to the given time under the assumed meridian, *increased* or *diminished* by the difference (*in time*) of the two meridians, according as the assumed meridian is to the *Westward* or *Eastward* of Greenwich. In a mean solar day or 24 mean solar hours, the Earth, by its rotation from West to East, has caused every meridian in succession from East to West to pass the mean Sun; and since the motion is uniform, all the meridians distant from each other 15° will have passed the mean Sun, at intervals of one mean hour; the meridian to the eastward passing first, or being, as compared with the Sun, always one mean hour in advance of the westerly meridian. When it is 6<sup>h</sup> after mean noon at a place 15° West of Greenwich, it is therefore 7<sup>h</sup> after mean noon at Greenwich; and it is for this Greenwich time that we must deduce the quantities \* required from the Ephemeris.

If a chronometer adjusted to Greenwich mean time be at hand, the Greenwich time may be immediately obtained by applying a correction, deduced from the daily rate and interval elapsed.

The day of the month in this Ephemeris (Page I. excepted, being for *apparent* noon) is assumed to begin at mean noon of the corresponding civil day, or at the instant when a clock shows 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>, Greenwich mean time, and is continued through the 24 hours, to the following mean noon; it may therefore be called the *mean astronomical day*, although, in practice, astronomers begin the day at the moment the true Sun's centre is on their meridian.

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\* Meridian passages, or times of transit, excepted. See cases of the Moon in page 523.



In the civil, or common, method of reckoning, the day commences at the *preceding* midnight, and is counted only to 12 hours or noon, when the 12 hours are reckoned over again to the next midnight. The civil reckoning is therefore always 12<sup>h</sup> in advance of the astronomical reckoning; hence the well known rule for determining the latter from the former, viz. :—For P.M. civil times make no change, but for A.M. ones, diminish the day of the month by 1 and add 12 to the hours. Thus :—Jan. 2<sup>nd</sup>, 7<sup>h</sup> 49<sup>m</sup> P.M. civil time, is Jan. 2, 7<sup>h</sup> 49<sup>m</sup> astronomical time, but Jan. 2<sup>nd</sup>, 7<sup>h</sup> 49<sup>m</sup> A.M. civil time, is Jan. 1, 19<sup>h</sup> 49<sup>m</sup> astronomical time.

To each month there are devoted twenty pages, distinguished by the Roman numerals I. to XX.

For convenience of interpolation, the quantities that follow next in order of succession have been added at the bottom of each page. Thus the quantities opposite to February 1 will be found inserted also opposite to January 32, the number of the days in each month having been intentionally increased for such purpose.

#### Page I. of each Month.

The contents of this page are adapted to *apparent noon*, or the instant when the Sun's centre is on the meridian of Greenwich. The *Sun's Right Ascension*, here given, is *affected with aberration*, and reckoned from the true equinox; it is therefore the sidereal time at apparent noon, or the time which ought to be shown by a sidereal clock, at that instant. The *Sun's Apparent Declination* is the angular distance of the Sun from the equator, measured on the meridian.

The *Diff. for 1 hour* is intended to facilitate the reduction of the quantities from apparent noon to any other time. It is the diff. at *noon* and requires to be reduced to midway between noon and the time at which the R.A., Dec., or Eq. of time is required. *Example* :—Required the Sun's Declination on Jan. 16<sup>th</sup>, 1870, at apparent noon in longitude 60° West of Greenwich; the longitude in time is 4<sup>h</sup>, and being West, the corresponding apparent astronomical time at Greenwich is Jan. 16, 4<sup>h</sup>; the diff. of the Dec. for 1 hour at Jan. 16, 0<sup>h</sup> or noon is 28'' 76, and at Jan. 17, 0<sup>h</sup> it is 29'' 75, therefore for midway between Jan. 16, 0<sup>h</sup> and 4<sup>h</sup> it is 28'' 84, which multiplied by 4 gives 1' 55'' 4 to be *subtracted* from the Dec. at noon, or S. 20° 55' 5'' 4; the Dec. required is therefore S. 20° 53' 10'' 0.

The *Sidereal Time of the Sun's Semidiameter passing the Meridian* is useful for reducing a transit observation of either limb of the Sun, when one only has been observed, to the transit of the centre.

The *Equation of Time* is the difference between apparent and mean time, and therefore serves for the conversion of either time into the other. The numbers here given, show, for Greenwich apparent noon, the distance of the mean Sun from the meridian, or the portion of time to be *added to* or *subtracted from*, (according to the precept at the head of the column,) Greenwich apparent noon to obtain the corresponding mean time at the same meridian, or the time which ought to be shown by the mean time clock.

Where time is deduced from observations of the Sun, the *immediate* result is *apparent* time; to convert it into mean time, the equation of time is necessary, and it is to be applied to apparent time, according to the precept at the head of the column.

Thus, suppose the apparent time deduced from an observation of the Sun on Jan. 16<sup>th</sup>, 1870, in longitude 45° or 3<sup>h</sup> East of Greenwich, to be 6<sup>h</sup> P.M. civil time, and it were required to convert it into mean time; subtracting the difference of longitude 3<sup>h</sup> from the apparent time at the place, we have Jan. 16, 3<sup>h</sup> for the



corresponding astronomical apparent time at Greenwich. The difference of the equation for 1 hour at January 16,  $0^h$  or *apparent noon* is  $0^s.844$ , and at Jan. 17,  $0^h$  it is  $0^s.815$ , consequently, for midway between noon and  $3^h$ , or  $1^h 30^m$ , it is  $0^s.842$ , which multiplied by 3, gives  $2^s.526$  for the variation in 3 hours, and this being added (because the equation is increasing) to  $10^m 3^s.75$ , the equation of time at apparent noon, the result is  $10^m 6^s.28$ , to be added (according to the precept at the head of the column) to the given apparent time  $6^h$ , whence we obtain  $6^h 10^m 6^s.28$  for the mean time required.

At page I. of the month of April, we observe, at the head of the column *added to*  
*subt. from* which signifies that a change of precept occurs in the course of the month ; and between the equations opposite to April 15 and 16, a black line, indicating that the change occurs between those days. The upper precept applies to all the quantities above the black line ; and the lower precept to all the quantities below it : that is, in the instance referred to, the equation of time is to be *added to* apparent time from April 1, to the instant at which the equation becomes  $0^m 0^s$ , which happens between April 15 and 16 ; but after that instant the equation is to be *subtracted from* apparent time to obtain mean time.

#### Page II. of each Month.

The *Sun's Apparent Right Ascension* and *Declination* at mean noon have been deduced from its *apparent* Longitude and Latitude given at page III., and the *apparent* obliquity of the ecliptic at page 242. They denote the *apparent* position of the true Sun with reference to the equator, and the true equinox, at the instant the Greenwich mean time clock indicates  $0^h 0^m 0^s$ , or when the hour angle of the true Sun is equal to the equation of time.

To find the Right Ascension and Declination for any other mean time and place, as at  $9^h 20^m$  A.M. civil time March 2nd, 1870, in longitude  $98^\circ$ , or  $6^h 32^m$ , West of Greenwich. The astronomical time, corresponding to  $9^h 20^m$  A.M. March 2nd, is March 1,  $21^h 20^m$ , agreeably to what has been said before. The longitude, being West of Greenwich, must be added to March 1,  $21^h 20^m$ , and the result, March 2,  $3^h 52^m$ , is the corresponding Greenwich mean time, for which the Right Ascension and Declination are to be found. The difference between the Right Ascensions on March 2 and 3 is  $3^m 43^s.95$ , that is, in the 24 mean hours succeeding March 2, the Right Ascension has increased by this quantity ; it will, therefore, have received a proportional part of the increase in  $3^h 52^m$ , and the amount is readily obtained by this proportion:— $24^h : 3^m 43^s.95 :: 3^h 52^m : 36^s.08$ ; which, being *added* to  $22^h 52^m 38^s.12$ , the Right Ascension opposite March 2, gives  $22^h 53^m 14^s.20$ , for the Right Ascension at the time proposed.

In a similar manner the Declinations indicate a decrease of  $22' 57''.6$  in the 24 hours ; therefore,  $24^h : 22' 57''.6 :: 3^h 52^m : 3' 41''.9$ , the proportional part of the decrease for  $3^h 52^m$ , which, *subtracted* from  $S. 7^\circ 9' 53''.6$  leaves  $S. 7^\circ 6' 11''.7$  for the Declination required. Correction for second difference would increase the Right Ascension by  $0^s.03$ , and the Declination by  $0''.4$ .

The *Semidiameter of the Sun*. The numbers in this column express the angle at the centre of the earth subtended by the Sun's semidiameter, and are required for reducing observations of the limb to the centre, as in the instance of measuring the altitude of the Sun's upper or lower limb, or the distance of the Moon from the Sun.

*Equation of Time*. The numbers in this column are the values of the equation at the instant of mean noon, and therefore serve more particularly to convert *mean* into *apparent* time ; for which purpose we have only to apply the equation according



to the precept at the head of the column. Thus, if from mean noon of April 2, or April 2, 0<sup>h</sup>, be subtracted the equation 3<sup>m</sup> 37<sup>s</sup> 70; April 1, 23<sup>h</sup> 56<sup>m</sup> 22<sup>s</sup> 30 is the corresponding apparent time. To find the equation of time at 3<sup>h</sup> A.M. civil time on April 16th, 1870, in longitude 105°, or 7<sup>h</sup> 0<sup>m</sup>, East of Greenwich. Subtract the difference of longitude from the given time, because it is East, and the corresponding astronomical mean time at Greenwich is April 15, 8<sup>h</sup> 0<sup>m</sup>. The variation in 24 hours is 14<sup>s</sup> 79, that is, the *sum* of the equations belonging to April 15 and 16, because the equation has decreased to 0 and then increased in the interval, therefore

$$24^h : 14^s \cdot 79 :: 8^h 0^m : 4^s \cdot 93,$$

which, being greater than 0<sup>m</sup> 0<sup>s</sup> 46, the equation on April 15, which was decreasing, shows that in the 8<sup>h</sup> 0<sup>m</sup> the equation has passed through its state of decrease to zero or 0, and is now increasing. The difference 4<sup>s</sup> 47 is the equation of time at the time proposed, and is to be added to mean time, because it has passed the zero.

*Sidereal Time at Mean Noon* is the angular distance of the first point of Aries, or the true vernal equinox, from the meridian, at the instant of mean noon: it is therefore the Right Ascension of the mean Sun, or the time which ought to be shown by a sidereal clock at Greenwich, when the mean time clock indicates 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>.

A sidereal clock represents the rotation of the Earth on its axis, as referred to the stars, its hour hand performing a complete revolution through the 24 hours in the interval between the departure of any meridian from a star and its next return to it. At the moment that the vernal equinox, or a star whose Right Ascension is 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>, is on the meridian of Greenwich, the sidereal clock ought to show 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>, and at the succeeding return of the star, or the equinox, to the same meridian, the clock ought to indicate the same time.

The sidereal time here given is that in common use among astronomers, and expresses the actual hour angle from the meridian, westward, of the true equinoctial point at the moment of observation. It is therefore affected by the equation of the equinoxes; and is not, strictly speaking, a *mean* or uniformly increasing quantity. It ought, therefore, to be termed *apparent sidereal time* in the same manner as apparent solar time reckons from the actual arrival of the sun's centre on the meridian; and in like manner, as mean solar time is reckoned from the arrival of an imaginary sun, moving uniformly with its mean velocity, so *mean sidereal time* (whose expression would be simply  $\frac{\text{☉'s mean longitude}}{15}$ ) would be reckoned from the transit of, not the

*true*, but the *mean* equinoctial point. The smallness of the fluctuations to which a clock, regulated to *apparent* sidereal time compared with one regulated to *mean* sidereal time, is subject, being at the utmost only 2<sup>s</sup> 3 in a period of nineteen years, has prevented the practical inconvenience of this from being felt: no clock being sufficiently perfect to go during so long a period without frequent re-adjusting; and as the corrections applied by astronomers to the observed right ascensions of all objects are adapted to this supposed irregularity in the rate of the clock, the mean right ascensions thence deduced come out correct. It has, therefore, not been thought necessary, in this instance, to depart from received usage, however theoretically objectionable such a mode of counting time may appear, since a change in this respect would involve the necessity of a corresponding change in all tables of nutation.

The sidereal time at mean noon is useful in all cases where mean solar time is to be deduced from observations of the heavenly bodies. It serves to facilitate the reduction of sidereal to mean solar time, and *vice versa*, by the help of the tables commonly used for that purpose called a Table of Acceleration of Sidereal on Mean



solar time, and the corresponding Table of Retardation of Mean on Sidereal time, according to the following rule:—Convert the interval from the mean noon immediately preceding, from the denomination given, to that required; and if mean time be required, the result will at once be that which the clock should show; but if sidereal time be that sought, the result must be added to the sidereal time at the preceding mean noon.

*Example:*—To convert  $21^{\text{h}} 9^{\text{m}} 24^{\text{s}} \cdot 04$  sidereal time, January 2, 1870, into mean solar time, for the meridian of Greenwich.

	h	m	s
Sidereal time given - - - - -	21	9	24 <sup>04</sup>
Sidereal time at mean noon, January 2 - - - - -	18	47	41 <sup>00</sup>
<hr/>			
Interval in sidereal time from mean noon - - - - -	2	21	43 <sup>04</sup>
Retardation of mean on sidereal time for the interval	-	23	22

Mean solar time required - - - - - 2 21 19<sup>82</sup>

which is the interval elapsed since mean noon, expressed in mean time; and therefore the time which ought to be shown by a mean time clock.

*Vice versâ*, to convert  $2^{\text{h}} 21^{\text{m}} 19^{\text{s}} \cdot 82$  mean solar time, January 2, 1870, into sidereal time for the same meridian.

	h	m	s
Mean interval from mean noon, January 2 - - -	2	21	19 <sup>82</sup>
Acceleration of sidereal on mean time for the interval		+	23 <sup>22</sup>
<hr/>			
Sidereal interval from mean noon - - - - -	2	21	43 <sup>04</sup>
Sidereal time at mean noon, January 2 - - - - -	18	47	41 <sup>00</sup>
<hr/>			
Sidereal time required - - - - -	21	9	24 <sup>04</sup>

which ought to be the time shown by the sidereal clock at the instant in question.

If the place of observation be not on the meridian of Greenwich, the sidereal time must be corrected by the *addition* of  $9^{\text{s}} \cdot 8565$  for each hour (and proportional parts for the minutes and seconds) of longitude, if the place be to the west of Greenwich; but by its *subtraction*, if to the east. Thus in  $9^{\text{h}} 10^{\text{m}} 6^{\text{s}}$  west longitude, the sidereal time at mean noon, January 2, instead of being, as in the foregoing Example,  $18^{\text{h}} 47^{\text{m}} 41^{\text{s}} \cdot 00$ , must be corrected by adding  $1^{\text{m}} 30^{\text{s}} \cdot 37$ , thus giving  $18^{\text{h}} 49^{\text{m}} 11^{\text{s}} \cdot 37$  for the time to be used, instead of that set down in the column.

The conversion of mean solar to sidereal time, and *vice versâ*, may, however, be performed, and with perhaps less liability to error, by means of this and of the column entitled *Mean Time of Transit of the First point of Aries*, at page XIX. of each month, using the Tables of Time Equivalents, inserted at pages 504 to 507.

To convert mean solar into sidereal time: To the sidereal time at the *preceding* mean noon add the sidereal interval corresponding to the given mean time; the sum will be the sidereal time required. (See Example at page 505.)

To convert sidereal into mean solar time: To the mean time at the *preceding* sidereal noon, add the mean interval corresponding to the given sidereal time; the sum will be the mean solar time required. (See Example at page 507.)

In this mode of reduction there is not, as in the former, by means of the Tables of Acceleration and Retardation, any distinction of cases, all the quantities being additive.

The Tables of Time Equivalents differ from the Tables of Acceleration and Retardation, in containing the *values* of intervals of each species of time, expressed in



terms of the other, instead of the *corrections*, respecting the proper application of which, a difficulty is sometimes felt by unpractised computers.

Sidereal time at mean noon is also used in finding the mean time of transit of a heavenly body.

### Page III. of each Month.

The *Sun's Longitude*, here given, is *affected with aberration*, and reckoned from the *true* equinox : it is therefore the apparent longitude of the Sun at the instant of mean noon ; or it is (if *R* denote the Radius Vector) the *true* Longitude of the Sun at the time  $0^h - 497^m \cdot 78$  R, because aberration causes the Sun to appear behind its true place in the Ecliptic.

The *Sun's Latitude* is the angular distance of the Sun's centre from the plane of the Ecliptic, measured on a circle perpendicular to that plane.

The *Logarithm of the Radius Vector of the Earth* is the logarithm of the distance between the centre of the Earth and the true place of the centre of the Sun at mean noon, the mean distance, or the semi-axis major of the orbit, being considered unity.

These quantities are derived *immediately* from the Solar tables, and enter into, indeed are the foundation of, nearly all the subsequent operations in the Ephemeris. Whenever the *true* Longitude of the Earth is required, as in calculating the Geocentric position of a Planet or Comet from its Heliocentric position, it is necessary to reduce the *apparent* Longitude of the Sun to the *true*, by correcting it for aberration. The Sun's aberration for every tenth day is given at page 242, and may thence be readily obtained for any other day of the year. (See *Sun's aberration*, page 532.)

The Sun's Longitude, entering into the expressions for aberration and solar nutation, is required for the reduction of the stars' places.

The *Moon's Semidiameter* is the angle under which her Semidiameter would appear if viewed from the centre of the Earth ; and her *Horizontal Parallax* is the *greatest* angle under which the Earth's equatorial semidiameter would appear if seen from the centre of the Moon. The former is requisite to obtain the position of the centre from an observation of the Moon's *limb*, as in all cases of altitudes or lunar distances. The latter, for computing the horizontal parallax of the Moon at any given latitude on the Earth, *considered as a spheroid* ; also for finding the parallax in altitude, right ascension, &c., for the purpose of reducing an observation of the Moon made on the surface of the Earth, to what it would be if made at the centre.

In reducing observations of the Moon made at sea, the horizontal *equatorial* parallax is generally used for finding the parallax in altitude, without regarding the previous reduction to the spheroid ; but in calculations requiring considerable precision, as in lunar occultations and solar eclipses, this reduction cannot be dispensed with.

*Example.* To find the Moon's semidiameter and horizontal parallax at 6<sup>h</sup> A.M. civil time, February 19<sup>th</sup>, 1870, at a place  $15^\circ$ , or  $1^h$  to the East of Greenwich. The equivalent mean astronomical time at the place, is February 18,  $18^h$ , from which subtracting  $1^h$ , because the place is to the East of Greenwich, we have February 18,  $17^h$  for the corresponding time at Greenwich, or  $5^h$  after midnight. Proceeding from the semidiameter given for Feb. 18,  $12^h$  or midnight, we must compute the proportional part of the variation in 12 hours due to the time elapsed since midnight, viz.  $5^h$  ; and for ordinary purposes at sea, it will suffice simply to take this propor-



tional part for the correction of the registered value preceding the given time; thus the semidiameter for February 18, 12<sup>h</sup> or midnight, is 16' 29''·3, and for 19, 0<sup>h</sup> or noon, it is 16' 27''·3; the difference 2''·0, is the variation in 12 hours. Therefore,

$$12^h : 2''\cdot0 :: 5^h : 0''\cdot8,$$

which *subtracted* (because the quantities are decreasing) from 16' 29''·3, gives 16' 28''·5 for the Moon's semidiameter at the time proposed. Similarly the *horizontal parallax* for February 18, 12<sup>h</sup> or midnight, is 60' 24''·6; and for 19, 0<sup>h</sup> or noon, it is 60' 17''·2; the difference 7''·4 is the variation in the 12 hours which include the given time; therefore, 12<sup>h</sup> : 7''·4 :: 5<sup>h</sup> : 3''·1, which *subtracted* (because the quantities are decreasing) from 60' 24''·6 gives 60' 21''·5 for the Horizontal parallax required. If greater accuracy be desired, a further correction must be applied to the values just obtained, on account of second differences, to compensate the error produced by supposing the first differences uniform. But the *greatest* error in the semidiameter which can arise by this supposition in the present instance is not two tenths of a second; for, select four semidiameters from the Ephemeris, two preceding, and two following the given time, and take the first and second differences thus:—

February 18,	0 <sup>h</sup>	16 30·4	—	1·1	—	''
	12	16 29·3	—	2·0	—	0·9
19,	0	16 27·3	—	2·8	—	0·8
	12	16 24·5				

The mean of the second differences is 0''·85 and  $\frac{1}{2}$  of this, which is the *greatest* effect, is only 0''·11.

A similar operation performed on the parallaxes will show the error that would arise on the supposition of uniform or equal first differences, to be four-tenths of a second.

#### Page IV. of each Month.

The *Moon's Longitude and Latitude* at mean noon and midnight indicate the position of the Moon at these respective times, referred to the Ecliptic and the true equinox, as it would be seen from the centre of the Earth. They are the results deduced immediately from the lunar tables, and are the foundation of all subsequent calculations in which the Moon is concerned. These quantities are now of little use to the seaman, as the position of the Moon, with respect to the Equator, is given for every hour in the succeeding pages; but the Moon's Longitude is involved in the formulæ for nutation, and is therefore necessary for its determination. In finding the Moon's Longitude and Latitude for any other times than those of mean noon and midnight, it is necessary to apply the equation of second, and sometimes even of third and fourth differences, on account of the irregular variation of her motion.

The *Moon's Age* at mean noon is the mean time elapsed since the Moon's ecliptic conjunction with the Sun, or since the Sun and Moon had the same Longitude. The numbers in this column represent her age at Greenwich, and are expressed in days, and decimal parts of a day.

The *Moon's Meridian Passage*.—This column contains the Greenwich mean astronomical time to the nearest tenth of a minute, at which the Moon's centre is on the *upper* meridian of Greenwich, and is useful to indicate when the Latitude may



be obtained from an observed meridian altitude of the Moon ; also, in conjunction with a table of semidiurnal arcs, to determine approximately the times of the rising and setting of the Moon : it is likewise useful in finding the time of High Water.

When the symbol ( $\delta$ ) denoting conjunction occurs, as on January 30, we are to understand that the Moon does *not* pass the *upper* meridian on that day at Greenwich. This is the case once in every lunation, and arises from the circumstance of the lunar day being greater than the mean solar day, and including it within its limits. In the present instance, the excess is  $0^h 52^m 3$ , or the lunar day is equal to  $24^h 52^m 3$  mean solar time ; the Moon passes the meridian Jan. 29,  $23^h 15^m 6$ , mean astronomical time at Greenwich, and does not return to the same meridian until Jan. 31,  $0^h 7^m 9$ . For the same reason there is also one day in every lunation on which the Moon does not transit the *lower* meridian, and this happens about the time of opposition, or when the difference of longitude of the Sun and Moon is  $180^\circ$ . In the list of Moon-culminating stars, at pages 390 to 428, the days on which only one transit occurs are readily seen. On January 31st (page 393), for instance, it appears that the Moon transits the *lower* meridian only, while on February 15th (page 394), the only transit is that at the *upper* meridian.

The mean astronomical time of transit under any other meridian may be obtained thus :—If the estimated civil time of transit is A.M. diminish the day of the month by 1, but if P.M. make no change. In either case take from the ephemeris the corresponding “Meridian Passage.”

If the longitude is East take the difference between this meridian passage and the one which precedes it, but if the longitude is West, the one which follows it.

Then say, *as*  $24^h$ , *is* to the difference of meridian passages, *so is* the longitude in time, *to* a correction, which subtracted from the meridian passage taken from the ephemeris, if the longitude is East, or added if West, gives the mean astronomical time of transit under the proposed meridian.

Thus :—Suppose on January 26th, 1870, about  $7^h 20^m$  A.M. civil time, in longitude  $60^\circ$ , or  $4^h$  East of Greenwich, it is required to know the mean astronomical time of the moon's transit. January 26th, A.M. civil time, is January 25, astronomical time ; opposite January 25 the meridian passage is  $19^h 36^m 3$ , and the difference between it and the *preceding* meridian passage is  $0^h 52^m 9$ , therefore  $24^h : 0^h 52^m 9 :: 4^h : 8^m 8$  to be subtracted from  $19^h 36^m 3$ , giving  $19^h 27^m 5$  for the time required. Had the longitude been West of Greenwich the difference between  $19^h 36^m 3$  and the *following* meridian passage must have been taken, and the result would have been  $24^h : 0^h 54^m 3 :: 4^h : 9^m 1$  to be added to  $19^h 36^m 3$ . Again, suppose on August 10th, 1870, about  $11^h 40^m$  P.M. civil time, in longitude  $40^\circ$ , or  $2^h 40^m$  West, it is required to know the time of the moon's transit. August 10th P.M. civil time is August 10 astronomical time, opposite to which, the meridian passage is  $11^h 48^m 6$ , and the difference between it and the *following* meridian passage is  $0^h 51^m 1$ , the correction is therefore,  $24^h : 0^h 51^m 1 :: 2^h 40^m : 5^m 7$ , to be added to  $11^h 48^m 6$ , giving  $11^h 54^m 3$  for the mean astronomical time of transit required.

The times thus deduced are only approximate ; but they are sufficiently accurate for the purposes usually required.



## Pages V. to XII. of each Month.

The *Moon's Right Ascension and Declination* for every hour of the day, with the *Difference of Declination for 10 minutes*. By means of the quantities here given, the Latitude, Time, Azimuth, Moon's rising and setting, &c., may be deduced, with nearly as little labour as is required in the case of the Sun. The numbers represent the position of the Moon, as it would appear from the centre of the Earth, with respect to the equator and the true equinox; and they are given for every hour, with the view of rendering any correction for second differences unnecessary, except where extreme precision is required. The Right Ascension for any time is readily obtained by simply adding the proportional part of the hourly variation due to the interval elapsed since the preceding hour. Thus, suppose the Right Ascension of the Moon were required at  $8^h 45^m$  P.M. mean civil time on January 12th, or January 12,  $8^h 45^m$  mean astronomical time, in longitude  $60^\circ$ , or  $4^h$  East of Greenwich. The given time,  $8^h 45^m$ , diminished by  $4^h$ , gives the corresponding Greenwich time  $4^h 45^m$ . The Right Ascension at  $4^h$  is  $3^h 27^m 28.85$ , and at  $5^h$  it is  $3^h 29^m 29.80$ ; the difference  $2^m 0.95$ , is the increase in the interval, or  $60^m$ . Hence,  $60^m : 2^m 0.95 :: 45^m : 1^m 30.71$ , which being *added* to the Right Ascension at  $4^h$ , gives  $3^h 28^m 59.56$  for the Right Ascension at  $4^h 45^m$  at Greenwich, or at  $8^h 45^m$  under the proposed meridian. The Declination might be found in a similar manner, but as the effect of second difference is frequently appreciable, it is preferable to use the "Diff. Dec. for  $10^m$ ." reduced to midway between the time for which the Declination is required and the preceding hour in the ephemeris. In the present case the time is  $4^h 45^m$ ; the "Diff. Dec. for  $10^m$ " at  $4^h$ , is  $86'' 69$ , and at  $5^h$ ,  $86'' 14$ ; for  $4^h 22\frac{1}{2}^m$  it is therefore  $86'' 48$ . Hence we say,  $10^m : 86'' 48 :: 45^m : 6' 29'' 2$ , which being *added* (because the Declinations are increasing) to N.  $13^\circ 53' 2'' 3$ , the Declination at  $4^h$ , gives N.  $13^\circ 59' 31'' 5$ , for the Declination at the time proposed.

The *Phases of the Moon*. These are given at page XII. to the nearest tenth of a minute. The numbers denote the Greenwich mean astronomical time, at which the difference of Longitude between the Sun and the Moon is  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ , or  $270^\circ$ , being

- $0^\circ$  at the New Moon,
- $90^\circ$  at the First Quarter,
- $180^\circ$  at the Full Moon,
- $270^\circ$  at the Last Quarter.

The *Moon's Apogee and Perigee*. The numbers here given indicate, to the nearest hour, the Greenwich mean time at which the Moon is respectively at her greatest and least distance from the Earth.

## Pages XIII. to XVIII. of each Month.

*Lunar Distances*.—These pages contain, for every third hour of Greenwich mean time, the angular distances between the apparent *centres* of the Moon and certain heavenly bodies, such as they would appear to an observer at the centre of the Earth. When a Lunar Distance has been observed on the surface of the Earth, and reduced to the centre, by clearing it of the effects of parallax and refraction, the numbers in these pages enable us to ascertain the exact Greenwich mean time at which the objects would have the same distance. They are arranged, from *west to east*, commencing each day with the object which is at the greatest distance *westward* of the Moon, in the precise order in which they appear in the heavens; W. indicating that the object



is west, and E. east of the Moon. Thus we have at one view, by a simple reference to the date, all the lunar distances which are available for the determination of the Longitude.

The columns headed "P.L. of diff." contain the proportional logarithms of the differences of the distances at intervals of three hours, which are used in finding the Greenwich time corresponding to a given distance, according to the following rule, viz.: For the given day, seek in the Ephemeris for the *nearest* distance *preceding*, in order of time, the given distance, and take the difference between it and the given distance; from the proportional logarithm of this difference subtract the proportional logarithm standing opposite to the said *nearest* distance in the Ephemeris; the remainder will be the proportional logarithm of a portion of time to be added to the hour answering to the *nearest* distance, to obtain the approximate Greenwich mean time corresponding to the given distance.

If the distance between the Moon and a Star increased or decreased uniformly, the Greenwich times corresponding to a given distance, as found by the above rule, would be strictly correct; but an inspection of the columns of the proportional logarithms in the Ephemeris will show that this is not the case; and as the knowledge of the exact Greenwich time is desirable, a correction must be applied to the time so found for the variation of the differences of the distances. This correction may be obtained by means of the Table at page 498 of the present volume, in the following manner:

1. Find the approximate interval by the preceding rule.
2. Take the difference between the proportional logarithms standing opposite to the distances in the Ephemeris which include the given distance.
3. With the approximate interval and this difference, as arguments, take out the correction from the table.
4. If the proportional logarithms are *decreasing*, *add* the correction to the approximate time; but if *increasing*, *subtract* it: the result will be the accurate Greenwich mean time.

*Example I.*—Suppose it were required to find the Greenwich mean astronomical time, at which the *reduced* distance between the Moon and  $\alpha$  Pegasi would be  $44^{\circ} 19' 50''$  about January 10th, 1870. It appears, by inspecting the distances, that the time must be Jan. 10, between III<sup>h</sup> and VI<sup>h</sup>: the *nearest* distance *preceding*, in order of time, the given distance is therefore the

Distance at III <sup>h</sup> -	-	43 45 29	and P. L. -	-	3919
Reduced Distance -	-	44 19 50			
Difference -	-	0 34 21	-	-	P. L. - 7194
Approximate Interval	1 <sup>h</sup> 24 <sup>m</sup> 41 <sup>s</sup>	-	P. L. -	-	3275

The difference between the proportional logarithms in the Ephemeris, at III<sup>h</sup>, and VI<sup>h</sup>, is 49. Opposite to 1<sup>h</sup> 24<sup>m</sup> 41<sup>s</sup> (or the quantity nearest to it, 1<sup>h</sup> 20<sup>m</sup>), and under 49, in the table, we have for the correction 15<sup>s</sup>, which, *added* to the approximate interval, 1<sup>h</sup> 24<sup>m</sup> 41<sup>s</sup>, because the proportional logarithms are *decreasing*, gives 1<sup>h</sup> 24<sup>m</sup> 56<sup>s</sup>, for the true interval after III<sup>h</sup>: the Greenwich mean astronomical time is therefore Jan. 10, 4<sup>h</sup> 24<sup>m</sup> 56<sup>s</sup>.



We see that, in the preceding Example, the omission of this correction would produce an error of only  $3' \cdot 75$  in the Longitude. Cases may, however, occur, in which it would be greater.

It will sometimes happen, that the difference of the proportional logarithms will exceed 138, the limit of the table of correction; in this case the table may be entered with the approximate interval, and *one-half or any fraction* of the difference of the proportional logarithms and the corresponding correction *increased in like proportion*.

*Example II.*—Suppose it were required to find the Greenwich mean astronomical time, at which the *reduced* distance between the Moon and  $\alpha$  Pegasi would be  $30^\circ 8' 2''$  about May 21st, 1870. By inspecting the distances, it appears that the time must be May 21, between XVIII<sup>h</sup> and XXI<sup>h</sup>; therefore take the

		0	'	''		
Distance at XVIII <sup>h</sup>		30	36	31	and P. L.	- - 5150
Reduced Distance	-	30	8	2		
		<hr/>				
Difference	- - -	0	28	29	- - P. L.	- - 8007
		<hr/>				
Approximate Interval	1 <sup>h</sup> 33 <sup>m</sup> 14 <sup>s</sup>	- -	P. L.	- -	2857	
		<hr/>				

The difference between the proportional logarithms in the Ephemeris, at XVIII<sup>h</sup> and XXI<sup>h</sup>, is 252, one-half of which is 126; under this number in the table, and opposite that nearest the approximate interval, is  $39^s$ : the correction is therefore  $78^s$  to be *subtracted* from the approximate interval, because the proportional logarithms are *increasing*; the Greenwich mean astronomical time is therefore May 21,  $19^h 31^m 56^s$ .

The omission of the correction in the preceding example would produce an error of  $19\frac{1}{2}'$  in Longitude; it may, however, be considered as an extreme case, and such as will seldom be met with.

The proportional logarithms also serve to point out the star which is most favourably circumstanced for accurate observation; that star being to be preferred which has the least proportional logarithm opposite to it; for, the greater the velocity of the Moon from or towards a Star, the greater is the reliance to be placed on an observation of the distance; and it is a property of proportional logarithms to decrease as their natural numbers increase: a smaller proportional logarithm, therefore, indicates a greater velocity of the Moon, or a greater variation of distance in the interval, upon which the value of the observation depends. Thus, on May 20, 1870, between *Noon* and III<sup>h</sup>, Saturn is the most eligible star, because the proportional logarithm, 2630, is less than that of any other; and, by inspecting the columns of proportional logarithms, it will appear to deserve the preference until the end of May 26.

On July 16, between IX<sup>h</sup> and *Midnight*, the following is the order of preference, as indicated by the proportional logarithms, viz., Saturn, Aldebaran, Jupiter,  $\alpha$  Arietis, Mars, SUN, Venus,  $\alpha$  Aquilæ.

It is by no means to be inferred from these remarks that observations of any of the distances are to be neglected; on the contrary, every registered star should invariably be observed when an opportunity offers. If, however, on a comparison of



results, a considerable difference should be discovered, the proportional logarithms will indicate the stars which are least liable to be affected by errors of observation, and therefore deserving of a greater degree of confidence as to the accuracy of the results obtained from them.

Page XIX. of each Month.

1. *Airy's Day Numbers, for correcting the Places of the Fixed Stars.*

These are computed from the logarithms of A, B, C, D, in page XX, by the formulæ in the introduction to the Greenwich Twelve-year Catalogue,\* and are used with constants found in that Catalogue. They have been employed for some time at the Royal Observatory, Greenwich, and their use is considered by the Astronomer Royal to possess some advantage over the well known method of Bessel, in consequence of there being no algebraic signs to attend to; the following example will illustrate their application, and serve for comparison with the similar operation by Bessel's method in pages 528-29.

Required the corrections of the Right Ascension and North Polar Distance of  $\gamma$  Orionis (No. 454 G<sup>h</sup> 12 Yr. Cat.) for Precession, Aberration, and Nutation, at Greenwich mean midnight on February 5, 1870.

Logarithms.		Nat. Nos.		Logarithms.		Nat. Nos.	
e	- - 0°08367			e'	- - 9°94196		
E	- - 1°05194			E	- - 1°05194		
	<u>1°13561</u>	- - - - -	13°665		<u>0°99390</u>	- - - - -	9°86
f	- - 0°10240			f'	- - 0°07185		
F	- - 1°59027			F	- - 1°59027		
	<u>1°69267</u>	- - - - -	49°280		<u>1°66212</u>	- - - - -	45°93
g	- - 1°45046			g'	- - 1°32770		
G	- - 0°00763			G	- - 0°00763		
	<u>1°45809</u>	- - - - -	28°714		<u>1°33533</u>	- - - - -	21°64
h	- - 0°07967			h'	- - 0°33894		
H	- - 1°46483			H	- - 1°46483		
	<u>1°54450</u>	- - - - -	35°035		<u>1°80377</u>	- - - - -	63°65
	Value of l	84°150			Value of l'	78°55	
	Value of L	89°323			Value of L	89°32	
	Sum - -	300°167			Sum - -	308°95	
	Constant -	300°0			Constant -	300°0	
Correction of Right Ascension +	<u>0°167</u>			Correction of North Polar Distance +	<u>8°95</u>		

2. *Mean Time of Transit of the First Point of Aries.*

The time in this column shows the distance of the *mean* Sun from the meridian, at the instant when the *true* point of intersection of the ecliptic and equator (called the first point of Aries) is on the meridian of Greenwich; and as the distance of the first point of Aries from the meridian, at the instant the mean Sun is on the meridian, is denominated sidereal time at mean noon, this may, by analogy, be termed the

\* Catalogue of 2156 Stars, formed from the observations made during twelve years from 1836 to 1847, at the Royal Observatory, Greenwich. London, 1849. 4to.



*mean time at sidereal noon.* It is the time which ought to be shown by a mean time clock adjusted to the Greenwich meridian, at the moment that a clock, adjusted to sidereal time, indicates exactly  $0^h 0^m 0^s$ . The use of this column is to facilitate the reduction of sidereal to mean solar time, with the help of the Table of Time Equivalents, given at pages 506 and 507, as has been already explained at page 520.

Page XX. of each Month.

1. *Bessel's Day Numbers, for correcting the Places of the Fixed Stars.*

In the formulæ which express the relation of the apparent place of a Star to its mean place, and reciprocally, there are certain factors which are independent altogether of the Star's place, and are therefore common to all Stars. These factors depend upon the longitudes of the Sun, Moon, and Moon's ascending Node.

The logarithms here given are the logarithms of these independent factors conveniently arranged for incorporation with other terms depending upon each particular Star, according to the method recommended by the late Professor Bessel. They have been computed for mean midnight at Greenwich, according to the formulæ exhibited at page 329, omitting in C and D the terms depending on  $z$  (.

In the form under which they now appear, they are chiefly used in conjunction with the Catalogue of the British Association,\* which contains the logarithms of the remaining factors depending on the Star's place; and for the reduction of any Star in that Catalogue, they appear to afford every facility that can be desired.

Where, however, the apparent place of any Star, *not in the British Association Catalogue*, is required, similar quantities to those must either be computed with reference to the particular Star, before we can use the A, B, C, D, or recourse must be had to other and independent means; such, for instance, as are afforded by the table at pages 330 and 331, which serves equally for all Stars. The formulæ by which this table has been constructed are given at page 329.

The following Examples will sufficiently illustrate the mode of using both tables, bearing in mind that the British Association Catalogue gives the correction of the Right Ascension ( $\Delta \alpha$ ), *in time*.

Required the Correction ( $\Delta \alpha$ ) of the Right Ascension and ( $\Delta \delta$ ) of the Declination of  $\gamma$  Orionis (No. 1687 B.A.C.) for Precession, Proper Motion, Aberration, and Nutation, at Greenwich mean midnight, on February 5, 1870.

1.—By the B.A.C. Constants and the Logarithms of A, B, C, D.

	$h$	$m$	$s$		$^{\circ}$	$'$	$''$
Mean $\alpha$ , Jan. 1, 1850 - - -	5	17	5.33	Mean $\delta$ - - - - -	+	6	12 34.3
20 Years' precession and proper motion +1		4.40		20 Years' precession and proper motion +1			13.5
Mean $\alpha$ , Jan. 1, 1870 - - -	5	18	9.73	Mean $\delta$ - - - - -	+	6	13 47.8

\* "The Catalogue of Stars of the British Association for the Advancement of Science; containing the Mean Right Ascensions and North Polar Distances of eight thousand three hundred and seventy-seven Fixed Stars, reduced to January 1, 1850: together with their annual precessions, secular variations, and proper motions, as well as the logarithmic constants for computing precession, aberration, and nutation. With a Preface explanatory of their Construction and Application. By the late Francis Baily, Esq." London, 1845. 4to.







3. *Mean Equinoctial Time.*

Mean Equinoctial Time signifies the mean time elapsed since the instant of the mean vernal equinox. The numbers in this column represent this time, at every mean noon, in mean solar days and fractional parts of a day; it is reckoned from the mean vernal equinox of 1869, between January 1, and March 22,  $214751$ , but after March 22,  $214751$ , from the vernal equinox of 1870; for the Equinoctial Year has been assumed equal to  $365.242216$  mean solar days; and as the Equinoctial Time corresponding to the mean noon of March 22, 1870, is  $365.027465$ , it is evident that the Equinoctial Year of 1869-70 will be completed, and a new year commenced, at  $0^d.214751$  after Mean Noon of March 22.

The Fraction of the day at the head of the column is common to all the days of the Equinoctial Year. Thus at mean noon of January 19, 1870, the Equinoctial Time is  $303^d.027465$ , and on January 20 it is  $304^d.027465$ , and so on until March 22,  $214751$ , when the year terminates, and the fractional part of the day changes. At Mean Noon of March 23, 1870, the Equinoctial Time is  $0^d.785249$ , and this fraction is to be annexed to all the numbers in the column of days, from the period of the change until the equinox of 1871.

At the instant the mean Sun arrives at the mean vernal equinox, it must also be on *some* meridian, and this meridian will then have its equinoctial time corresponding with its mean solar time, each of which will be  $0^h 0^m 0^s$ , and they will continue to correspond throughout the Equinoctial Year. At the end of the Equinoctial Year, the Sun will have passed this meridian 365 times, and have performed, besides, a certain portion of its 366th diurnal revolution, viz.  $0^d.242216$ ; it will, therefore, have arrived at some other meridian, which will now, in its turn, reckon the mean equinoctial and mean solar time from the same point, and remain constant for the year. Thus the meridian, from which the time is reckoned, is shifting its position at the end of every year by  $0^d.242216$ , or  $5^h 48^m 47^s.46$ , to the Westward. Between the vernal equinoxes of 1870 and 1871, this itinerant meridian corresponds to Longitude  $0^d.785249$  East, or  $5^h 9^m 14^s.48$ , West of Greenwich.

This species of time was first introduced in the Supplement to the Nautical Almanac for 1828, with a very full explanation of its nature and use. It there appears, that the use of Equinoctial Time is to afford an uniform date, which shall be independent of the different meridians, and of all inequalities in the Sun's motion, and shall thus save the necessity, when speaking of the time of any event happening, of mentioning at the same time the place where it was observed or computed. Thus, it is the same thing to say that a comet passed its perihelion on 1870, January 5,  $5^h 47^m 0^s.0$  mean time at Greenwich; at  $5^h 56^m 20^s.6$ , mean time at Paris; or at 1869,  $289^d 6^h 26^m 32^s.98$  equinoctial time; but the former dates make the localities of Greenwich and Paris enter as elements of the expression; whereas the latter expresses the period elapsed since an epoch common to all the world, and identifiable independently of all localities. By this means all ambiguities in the reckoning of time are supposed to be avoided.

To convert mean solar into equinoctial time: To the corresponding Greenwich mean time add the equinoctial time at mean noon of the same day at Greenwich: the sum will be the equinoctial time required. Thus, in the instance of the comet before alluded to, Paris being  $9^m 20^s.6$  East of Greenwich, subtract this from the Paris time and we get  $5^h 47^m 0^s.0$  for the corresponding Greenwich time, to which add  $289^d.027465$ , or  $289^d 0^h 39^m 32^s.98$ , the Mean Equinoctial Time at Greenwich mean noon of January 5, and the sum will represent the mean equinoctial



time of the comet's passage of its perihelion, viz.,  $289^d 6^h 26^m 32^s.98$ , from the vernal equinox of the year 1869.

It may here be stated, that in the Supplement to the Nautical Almanac for 1828, the equinoctial time is based on the mean Longitude in Delambre's Solar Tables, and an assumed *invariable* length of the Equinoctial year =  $365.242264$  mean solar days, with a recommendation that any subsequent improvements in the solar theory be disregarded. An alteration was, however, made in the Nautical Almanac for 1834, and continued to 1856, by substituting Bessel's mean Longitude and his *variable* length of the Equinoctial year. Sir John Herschel has suggested as an approximation to consistency, the correction of the equinoctial times 1827-28 to 1833-34, for the difference between Bessel and Delambre, and the permanent adoption, after 1856, of  $365.242216$  mean solar days for the length of the Equinoctial year. Between 1834 and 1856, the error arising from the assumed variable length is too minute to require notice, being at most  $.000002$ , and generally less.

The corrections of 1827-28 to 1833-34 are as under :—

1827-28	<sup>d</sup> +0.001802
1828-29	.001848
1829-30	.001894
1830-31	.001940
1831-32	.001986
1832-33	.002032
1833-34	+0.002078

#### 4. Day of the Year.

The numbers in this column indicate the complete days at mean noon which have elapsed since mean noon of January 1. Mean noon of January 1 is therefore reckoned 0, and 1 is found opposite to that of January 2, because at that instant one entire day has elapsed.

#### 5. Fraction of the Year.

These fractions are the quotients found by dividing the numbers in the preceding column by  $365.242$ . The day and fraction of the year are useful in many Astronomical calculations.

#### *Obliquity of the Ecliptic.* (Page 242.)

The apparent inclination of the plane of the Ecliptic to that of the Equator is here given for every 10th day of the year, and continued to January 6 of the following year, marked December 37 for the sake of convenience. This inclination is ever varying, as well from the effect of its mean diminution, as of the nutation of the earth's axis: it is an important element in deducing the positions of the heavenly bodies, with reference to either of the planes, when we know their positions with respect to the other; as, for instance, in computing Right Ascensions and Declinations from Longitudes and Latitudes, and *vice versâ*. If the apparent Obliquity be required for any date not to be found in the Table, it may be obtained by simply taking the proportional part of the variation of the obliquity corresponding to the interval which comprises the given date. Thus, the apparent Obliquity on November 1, 1870, is  $23^{\circ} 27' 19''.98$ . For the variation of the Obliquity in the ten days between October 28, and November 7, is  $0''.13$ , of



0".013 for one day, and this being multiplied by 4, the number of days between October 28, and November 1, gives 0".05, to be *subtracted* from the Obliquity of October 28. For most purposes, however, the Obliquity corresponding to the date in the Table nearest to the given date is sufficient, as is evident from an inspection of the quantities.

*Sun's Horizontal Parallax.* (Page 242.)

The Sun's Horizontal Parallax is the *greatest* angle under which the equatorial semidiameter of the earth would appear at the Sun's centre. It *varies inversely* as the distance, and the numbers in this column show the values for every tenth day of the year.

The Parallax serves for reducing a solar observation made at the surface of the earth to what it would have been if made at the centre.

*Sun's Aberration.* (Page 242.)

The progressive motion of light, combined with the motion of the Earth in its orbit, causes the Sun to appear in a different position from that which he really occupies, the true position being always in advance of the apparent. The numbers in this column indicate, for every 10th day of the year, the amount of aberration, or the quantity to be applied to the *true* Longitude of the Sun to obtain the *apparent* Longitude. The Longitudes derived from the solar tables include aberration, and are therefore *apparent* Longitudes, such as are contained in this Ephemeris. If the *true* Longitude of the Sun be wanted, as is the case in finding the longitude of the Earth for the calculation of the Geocentric place of a body, the aberration must be applied with a contrary sign. Thus, on April 11, 1870, at mean noon, by *adding* 20".39, the amount of aberration, to 21° 23' 11".2, the apparent Longitude of the Sun, we obtain 21° 23' 31".6 for the true Longitude.

*Precession in Longitude.* (Page 242.)

This column contains the amount of the retrograde motion on the Ecliptic of the point of intersection of the Equator and Ecliptic, or first point of Aries, for each 10th day from January 1, 1870, and is useful for reducing a longitude reckoned from the *Mean* Equinox of any given date to that of January 1, or any other date. Thus, suppose it were required to refer the true Longitude of the Sun on April 11, 1870, to the mean Equinox of January 1, 1870.

The *apparent* Longitude, from the true equinox of April 11, is 21° 23' 11".2; the aberration -20".39 and the Equation of the Equinoxes -16".77 being applied with the signs changed, give 21° 23' 48".36 for the *true* longitude from the mean equinox of April 11; and *subtracting* 13".76, the amount of precession, there results 21° 23' 34".60 for the true Longitude of the Sun on April 11, but reckoned from the mean equinox of January 1, 1870.

*Equation of the Equinoxes.* (Page 242.)

The Solar and Planetary Tables furnish us with the places of the heavenly bodies referred to the mean equinox; but the true place of the equinox at any time differs from its mean place, by a quantity which is termed the Equation of the Equinoxes; and the numbers here given show the value of the equation for every 10th day of the year. They are to be applied, with their proper signs to



the Longitudes reckoned from the mean equinox, to obtain the values with respect to the true equinox.

If the Longitude of a body be given with reference to the true equinox, as in this Ephemeris, and it be required to find its Longitude reckoned from the mean equinox, the equation of the equinoxes must be applied with a contrary sign. Thus, the Longitude of the Sun, reckoned from the true equinox, on April 11, 1870, is  $21^{\circ} 23' 11'' \cdot 2$ , and the Equation of the Equinoxes is  $-16'' \cdot 77$ ; therefore, applying it with the contrary sign, the sum  $21^{\circ} 23' 27'' \cdot 97$ , is the Sun's Longitude from the *mean* equinox on that day.

The Equation corresponding to any date not contained in the table, may be obtained in the usual way by interpolation.

The Equation of the Equinoxes in Right Ascension, in a similar manner, enables us to find the *apparent* point of intersection of the Ecliptic *on the Equator*; and is necessary in computing sidereal time, &c.

#### *Mean Longitude of C's ascending Node. (Page 242.)*

This column contains the Mean Longitude of the Moon's ascending Node, at mean noon of every 10th day of the year, reckoned from the mean equinox. The place for any intermediate day is easily found from the daily motion inserted at the foot of the column. The Longitude of the Node is necessary in many calculations; it is sometimes used to determine roughly the Stars which are likely to undergo occultation by the Moon.

#### *Sun's Co-ordinates. (Pages 243 to 250.)*

These pages contain for each Greenwich mean noon the Sun's true Geocentric Co-ordinates X, Y, Z; X being measured on a line passing through the true vernal Equinoctial point of the date; Y, on a line in the plane of the Equator, in the direction of the first point of Cancer; and Z, perpendicular to the plane of the Equator, towards the North. To facilitate cometary calculations reductions are given for converting the co-ordinates X, Y, Z, referred to the true equinox of the date, into co-ordinates referred to the mean equinox of January 1, 1870.

#### *Planetary Ephemerides at Mean Noon. (Pages 251 to 300.)*

These pages contain the Geocentric and Heliocentric places of the Planets, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune.

The Geocentric places are the places of the centres of the planets, as they would appear from the centre of the Earth; the Heliocentric, such as they would appear from the centre of the Sun.

The positions of Mercury, Venus, Mars, Jupiter, and Saturn are given for Greenwich Mean Noon on every day of the year, those of Uranus and Neptune for each fourth day. The Geocentric Right Ascensions and Heliocentric Longitudes, are reckoned from the true equinox. The Geocentric Right Ascensions and Declinations *are affected with aberration*, and are therefore *apparent* positions.

By means of the positions of Venus, Mars, Jupiter, and Saturn, and particularly of Venus and Jupiter, which are frequently visible when the Sun is above the horizon, the Latitude, Time, and Variation of the Compass, may be found with nearly as much facility and accuracy as by the Sun.

The column headed "Meridian Passage" shows the mean time of the Planet's transit over the meridian of Greenwich, and serves to find the mean time of transit over any other meridian. As in the instance of the Moon before noticed, there are



some days on which the planets do not pass the meridian ; these are indicated by two asterisks (\* \*). If we refer to page 254, we shall find that Mercury does not pass over the Greenwich meridian on Apr. 12, and for a similar reason, viz., that the planetary day is here longer than the mean solar day, and commences so near, but previously, to the noon of Apr. 12, viz.,  $2^m \cdot 9$ , as to want still  $0^m \cdot 8$  of its completion at the termination of Apr. 12. The planetary day, therefore, includes the solar day, April 12 : it begins *before* the solar day and ends *after* it, and the planet cannot arrive at the meridian at any period of it.

Another phenomenon takes place in the case of the planets, which, however, does not occur with the Moon ; it is that of two transits on the same day, which arises from the planetary day being sometimes *shorter* than the solar day, commencing *after* and terminating *before* the solar day, and thus falling entirely within it. This cannot be the case with the Moon, because the lunar day is always greater than the solar day. When two transits occur, the times of both are registered, as at page 255, June 4, where it appears that Mercury passes the Greenwich meridian  $1^m \cdot 0$  after mean noon of June 4, and again at  $23^h 54^m \cdot 9$  on the same day, or  $5^m \cdot 1$  before the arrival of the following Mean Noon.

The positions of the planets for any time not given in the Ephemeris, and under any other meridian than that of Greenwich, are to be found by interpolation in the usual way. *Example:* Required the Right Ascension and Declination of Mercury at 6<sup>h</sup> P.M. mean civil time on February 4<sup>th</sup>, 1870, in longitude  $30^\circ$  West of Greenwich ; also the time of Mercury's passage over this meridian. The difference of longitude  $2^h$ , *added* (because it is west) to the given time, gives Feb. 4,  $8^h$  for the corresponding Greenwich mean astronomical time.

1. *For the Right Ascension.* The Right Ascension on Feb. 4, is  $20^h 55^m 35^s \cdot 95$ , and on Feb. 5, it is  $20^h 50^m 53^s \cdot 81$  ; the difference  $4^m 42^s \cdot 14$ , is the variation of the Right Ascension in 24 mean hours ; therefore  $24^h : 4^m 42^s \cdot 14 :: 8^h : 1^m 34^s \cdot 05$  the proportional part of the variation answering to  $8^h$  ; and this proportional part *subtracted* (because the Right Ascensions are decreasing) from  $20^h 55^m 35^s \cdot 95$ , the Right Ascension for February 4,  $0^h$  or *noon*, gives  $20^h 54^m 1^s \cdot 90$  for the Right Ascension required, that is, on the assumption of invariable first difference ; including the effect of second difference, the Right Ascension would be  $20^h 54^m 0^s \cdot 58$ .

2. *For the Declination.* The Declination on February 4, is S.  $13^\circ 33' 2'' \cdot 9$ , and on Feb. 5, it is S.  $13^\circ 51' 25'' \cdot 9$ , the difference,  $18' 23'' \cdot 0$ , is the variation in 24 hours ; and the proportional part of this variation for  $8^h$  is  $6' 7'' \cdot 7$ , which, *added* to the Declination at Feb. 4,  $0^h$  or *noon*, gives S.  $13^\circ 39' 10'' \cdot 6$  for the Declination required ; the effect of second difference would be to diminish this quantity by  $7'' \cdot 9$ .

3. *For the Meridian Passage.* Take the difference of the times of two consecutive transits ; and considering this difference as an acceleration or retardation of the Meridian Passage while the planet has passed over  $24^h$  of geographical longitude, take the proportional part of it, due to the difference of meridians, for a correction to be applied to the Meridian Passage at Greenwich, bearing in mind that in east longitude the passage precedes that at Greenwich, when times are accelerated, and follows it, when they are retarded ; and the contrary in west longitude. In the present case Mercury passes the meridian of Greenwich at February 4,  $23^h 49^m \cdot 2$ , and again at Feb. 5,  $23^h 40^m \cdot 9$ , the difference is  $8^m \cdot 3$ , therefore  $24^h : 8^m \cdot 3 :: 2^h : 0^m \cdot 7$ , the proportional part to be *subtracted* from  $23^h 49^m \cdot 2$  (because the passages are retarded, and the longitude is west of Greenwich,) which



gives February 4, 23<sup>h</sup> 48<sup>m</sup>·5, mean astronomical time, or February 5th 11<sup>h</sup> 48<sup>m</sup>·5 A.M. civil time at the given place, for the Meridian Passage. Where great accuracy is not required this method will suffice.

*Parallaxes and Semidiameters.* (Pages 301 and 302.)

These pages contain the Equatorial Parallaxes and Semidiameters of Mercury, Venus, Mars, Jupiter, Saturn, and Uranus, for each 5th day of the year, with the factor for determining the Polar Semidiameter in the cases of Jupiter and Saturn.

*Planetary Ephemerides at Transit.* (Pages 303 to 324.)

These pages contain the Right Ascension and Declination at Transit over the Meridian at Greenwich, within the limits stated in the Preface to the Nautical Almanac for the Year 1861, and are readily reduced (approximately) to the time of transit over any other meridian by means of their Variations in 1 hour of Longitude. These variations apply to the time of transit over the meridian of Greenwich, and therefore require to be reduced to the longitude midway between Greenwich and the place at which the Right Ascension or Declination is required. As they are given at intervals of two transits, or 48 hours of longitude, proceed thus:—If the long. is *East* take the diff. between the given and *preceding* variation—if *West*, between the given and *following* one; in either case say, as 48<sup>h</sup> is to the diff. of variation, so is *half* the longitude in time to the correction required. For the intermediate day add 24<sup>h</sup> to *half* the longitude in time. Then prefix the sign — to the Longitude of the proposed meridian if it be east of Greenwich, but + if it be west, and multiply it by the corrected variation; the product applied *algebraically* (South Declination being considered as negative) to the transit result for Greenwich, will give that for the proposed meridian. *Example:* Suppose the Right Ascension and Declination of Mercury were required in longitude 60° or 4<sup>h</sup> east, on March 2, 1870. The Right Ascension on March 2 (page 304) is 21<sup>h</sup> 13<sup>m</sup> 42<sup>s</sup>·25 and its “Var. in 1 hour of Long.” + 11<sup>s</sup>·57, which corrected as above is + 11<sup>s</sup>·54: the product of + 11<sup>s</sup>·54 and — 4<sup>h</sup> is — 46<sup>s</sup>·16, which, applied to 21<sup>h</sup> 13<sup>m</sup> 42<sup>s</sup>·25, the Transit Right Ascension at Greenwich, gives 21<sup>h</sup> 12<sup>m</sup> 56<sup>s</sup>·09 for that at the place. The Declination on March 2 is S. or — 16° 47′ 37″·3, and its variation + 28″·5, which corrected as above is + 28″·2, and the product of + 28″·2, and — 4<sup>h</sup> is — 1′ 52″·8, which applied to S. or — 16° 47′ 37″·3, gives S. 16° 49′ 30″·1 for the Declination at the place. Had the day been March 1, the corrected variation of the Right Ascension would have been + 11<sup>s</sup>·18, and that of the Declination, + 24″·7.

The “Sid. Time of Sem. pass. Mer.” (Sidereal Time of the Semidiameter passing the Meridian,) serves to reduce an observation of the Right Ascension of the limb, to that of the centre, and the “Semidiameter” answers a similar purpose for the Declination.

The “Hor. Par.,” or Horizontal Parallax, serves for reducing an observation made at the surface to the centre of the Earth.

*Fixed Stars.* (Pages 325 to 389.)

In pages 325 to 328 are given the Mean Right Ascensions and Declinations of 147 fixed Stars for Jan. 0 + 0<sup>d</sup>·048, 1870, together with their Annual Variations.

North Declination is distinguished by N., and South Declination by S.

The sign + prefixed to an Annual Variation of Right Ascension indicates that the variation is to be *added to*, and the sign —, that it is to be *subtracted from*, the Right Ascension: also, for Stars having *North* Declination, + signifies *add*, and



— *subtract*: but for Stars of *South* Declination, + denotes that the Variation is to be *subtracted from*, and — that it is to be *added to*, the Declination.

*Example \* 1.* Required the Mean Right Ascension and Declination of  $\alpha$  Tauri or *Aldebaran* on May 31, 1870. The Annual Variation of the Right Ascension is  $+ 3^{\circ} 43' 53''$ ; the Fraction of the year corresponding to May 31, is  $\cdot 4107 + \cdot 0026 = \cdot 4133$  (page XX. of May); the product of these numbers ( $1^{\circ} 42'$ ) is the proportional part of the annual variation due to the period elapsed since January  $0 + 0^{\circ} 04' 8''$ , which *added*, because the sign is +, to the Mean Right Ascension on Jan.  $0 + 0^{\circ} 04' 8''$ , viz.,  $4^{\text{h}} 28^{\text{m}} 27^{\text{s}} \cdot 782$ , gives  $4^{\text{h}} 28^{\text{m}} 29^{\text{s}} \cdot 202$ , for the Mean Right Ascension on May 31. The Annual Variation of the Declination is  $+ 7^{\circ} 62'$ , which, multiplied by  $\cdot 4133$  as before, and the product ( $3^{\circ} 15'$ ) *added*, because the sign is + and the Declination *North*, to the Mean Declination on Jan.  $0 + 0^{\circ} 04' 8''$  viz., N.  $16^{\circ} 14' 44'' \cdot 14$ , gives N.  $16^{\circ} 14' 47'' \cdot 29$ , for the Mean Declination required.

*Example 2.* Required the Mean Right Ascension and Declination of  $\beta$  Ursæ Minoris on June 3, 1870. Here the Annual Variation of Right Ascension is  $- 0^{\circ} 24' 89''$ , and the fraction of the Year  $\cdot 4189 + \cdot 0026 = \cdot 4215$  (page XX. of June); the product ( $0^{\circ} 10' 5''$ ) therefore being *subtracted*, because the sign of the Annual Variation is —, from  $14^{\text{h}} 51^{\text{m}} 6^{\text{s}} \cdot 857$ , the Right Ascension on Jan.  $0 + 0^{\circ} 04' 8''$ , gives  $14^{\text{h}} 51^{\text{m}} 6^{\text{s}} \cdot 752$ , for the Right Ascension on June 3, 1870.

For the Declination, we have the Annual Variation  $= - 14^{\circ} 75'$ , which, multiplied by  $\cdot 4215$ , gives  $6^{\circ} 22'$ . The Declination being *North*, and the sign of the Variation —, this product must be *subtracted* from N.  $74^{\circ} 41' 11'' \cdot 24$ , and the result is N.  $74^{\circ} 41' 5'' \cdot 02$ .

*Example 3.* Required the Mean Declination of  $\alpha$  Scorpii or *Antares* on May 31, 1870. The Annual Variation is  $- 8^{\circ} 38'$ , and the fraction of the Year  $\cdot 4133$ ; the product of these numbers ( $3^{\circ} 47'$ ) being *added*, because the Declination is *South*, and the sign of the Variation —, to the Declination on Jan.  $0 + 0^{\circ} 04' 8''$ , viz., S.  $26^{\circ} 8' 27'' \cdot 62$ , the sum, S.  $26^{\circ} 8' 31'' \cdot 09$ , is the Declination on May 31, 1870.

Next (page 329) follow Bessel's Formulæ of Reduction; and (pages 330 and 331) a Table for the reduction of Stars, independently of the Constants, in the Catalogue of the British Association, an example of which is given at page 529.

The apparent places of  $\alpha$  and  $\delta$  Ursæ Minoris are given for every day of the year, and those of the remaining 145 Stars for every *tenth* day.

The hours and minutes of Right Ascension, and the degrees and minutes of Declination, are placed at the heads of the columns as constants, and belong equally to all the numbers below them. This arrangement has rendered it necessary in numerous instances, to continue the seconds beyond 60, as the width of the page would not permit of otherwise indicating any change in the minutes. Thus, the apparent Right Ascension of  $\alpha$  Leporis at page 346, on Dec. 17th, 1870, is registered  $4^{\text{h}} 59^{\text{m}} 60^{\text{s}} \cdot 42$ , and is to be read  $5^{\text{h}} 0^{\text{m}} 0^{\text{s}} \cdot 42$ . On the same day the Declination of  $\alpha$  Leporis (page 348) is registered S.  $17^{\circ} 54' 62'' \cdot 7$ , which signifies S.  $17^{\circ} 55' 2'' \cdot 7$ .

The small figures on the right hand of the vertical column of seconds represent the differences of the quantities above and below them on the left, or the variation of Right Ascension and Declination in 10 days, and serve to find, by interpolation, the

\* Similar examples to these have been given in the Nautical Almanacs 1834 to 1869, but Nautical Men will find it more convenient to consult pages 332 to 387, from which the Stars' Right Ascensions and Declinations can be obtained with more accuracy by inspection. Thus, in page 345, the Right Ascension of *Aldebaran* on May 31, is  $4^{\text{h}} 28^{\text{m}} 26^{\text{s}} \cdot 68$ , and the Declination N.  $16^{\circ} 14' 38'' \cdot 1$ .



values for an intermediate day. As in the case of the Planets before explained, a Star will sometimes arrive at the meridian twice in one apparent solar day. When this occurs on one of the given dates, the Star's place is registered for each transit as at page 354, for  $\epsilon$  Hydræ on July 30; but in other cases the day of the month on which two transits occur is placed opposite to the interval. In these particular instances the Star passes the meridian 11 times in the 10 apparent solar days, and consequently the Right Ascension or Declination at transit on any intermediate day is to be determined by taking  $\frac{11}{10}$ th part, instead of  $\frac{1}{10}$ th, of the variation in the interval. Thus, at page 348, we find in the instance of  $\epsilon$  Orionis the figures 13 opposite the interval between June 10 and June 20, indicating that the double transit occurs on June 13, and a difference of  $0^{\circ}12$  opposite to the interval between the seconds belonging to those dates,  $\frac{1}{10}$  of which is  $0^{\circ}11$ ; for the first transit on June 13, we should therefore multiply  $0^{\circ}11$ , by the days elapsed since June 10, but for the second and following transits by the days elapsed increased by 1.

When extreme accuracy is required, the apparent places of the 5 Polar Stars demand a further correction, depending on the terms which involve  $2\phi$ . The apparent places do not include these corrections, on account of the rapid variation of the argument, viz., about  $26^{\circ}$  in a day, but they are given in a Table at pages 388 and 389, for every degree of the Moon's Longitude, and may be readily applied, agreeably to the precept at the foot of that Table.

Formulae for correcting for *daily* aberration are given in the Preface.

#### *Moon-Culminating Stars. (Pages 390 to 428.)*

Those Stars are denominated Moon-Culminating Stars, which being near the Moon's parallel of Declination, and not differing much from her in Right Ascension, are proper to be observed with the Moon, in order to determine differences of meridians. This is effected by comparing the differences of the observed Right Ascensions of such a Star and the Moon's bright limb at any two meridians. If the Moon had no motion, the difference of her Right Ascension from that of the Star would be constant at all meridians; but in the interval of her transit over two different meridians, her Right Ascension will have varied, and the difference between the two compared differences will exhibit the amount of this variation, which added to the differences of the meridians, shows the angle through which the westerly meridian must revolve before it comes up with the Moon; hence, and knowing the rate of her increase in Right Ascension, the difference of Longitude may be easily obtained.

For the determination of this variation, recourse has hitherto been had to actual observations made at different meridians, because any errors in the computed places of the Moon and Stars are thereby avoided: and the places were formerly given merely with the view of indicating the times when the observations were to be made. In the present list, however, the Right Ascensions are given with every possible degree of accuracy, so that they may be considered, at least approximately, in the light of corresponding observations made at Greenwich, and be taken to represent the indications of the Greenwich instruments, the same as though they had been actually observed. The traveller has thus an opportunity of rendering his observations immediately available for determining his longitude with considerable accuracy.

*The Right Ascension of the Moon's bright limb and Declination of her centre, at the instant of their respective transits at Greenwich, are given for the lower as well as the upper Culmination, L. being put to denote the Lower Culmination, and U.*



the Upper Culmination ; the Roman numerals indicate the limb of the Moon with reference to its transit over the meridian. The Moon's age at the time of her upper transit, to the nearest tenth of a day, is inserted in the column containing the magnitudes of the Stars.

The numbers in the column "Var. of  $\zeta$ 's R.A. in one hour of Long." represent the Variation in Right Ascension of the Moon's Limb during the interval of her transit over two meridians, equidistant from that of Greenwich, and *one* hour distant from each other. They have been deduced from the Right Ascensions of the *bright limb*, and therefore include the effect produced by the change of the semidiameter.

They serve to determine the Longitude where the difference of meridians is not very great ; but where this difference is considerable, and extreme accuracy is wanted, that variation in Right Ascension should be used which corresponds to the middle of the interval between the observations, which may be readily obtained by interpolation. They also serve to determine (approximately) the Right Ascension of the bright limb at its transit over any other meridian. Thus: Multiply the difference of longitude between Greenwich and the given meridian, by the variation ; and, according as the given meridian is east or west of Greenwich, subtract or add the product to the Right Ascension at Greenwich ; the result will be the Right Ascension of the bright limb at transit over the proposed meridian. *Example*: On June 18, 1870, the Right Ascension of the Moon's second limb is  $22^{\text{h}} 47^{\text{m}} 47^{\text{s}}.24$ , at its upper transit at Greenwich, and the variation for 1 hour of longitude is  $124^{\text{s}}.50$ : Required the Right Ascension of the limb at its upper transit at Paris. Paris is  $9^{\text{m}} 20^{\text{s}}.6$ , or  $0^{\text{h}} 156$ , East of Greenwich ; therefore, multiplying  $124^{\text{s}}.50$  by  $0.156$ , and subtracting the product,  $19^{\text{s}}.42$  from  $22^{\text{h}} 47^{\text{m}} 47^{\text{s}}.24$ , we have  $22^{\text{h}} 47^{\text{m}} 27^{\text{s}}.82$ , for the Right Ascension at Paris.

In a similar manner the Declination may be determined (approximately) at transit over any other meridian not far distant from that of Greenwich, bearing in mind that South Declinations and East Longitudes are to be considered as *negative*. Thus, in the above *Example*: The Moon's Declination at her upper Transit at Greenwich is  $\text{S. } 12^{\circ} 3' 41'' .8$  and the "Var. of  $\zeta$ 's Dec. in 1 hour of Long." is  $+ 623'' .1$ , which, multiplied by  $- 0.156$ , gives  $- 1' 37'' .3$ , to be applied to S. or  $- 12^{\circ} 3' 41'' .8$  ; the Declination at the upper transit at Paris is therefore  $\text{S. } 12^{\circ} 5' 19'' .1$ .

Where an asterisk is placed opposite to a Star's name, it is intended to denote that the Star is favourably situated for observing its Declination along with that of the Moon in both Hemispheres, with a view to the accurate determination of the Moon's Parallax.

The numbers in the column entitled "Sid. Time of  $\zeta$ 's Sem. pass. mer.," express the Sidereal intervals which the Moon's Semidiameter, at the time of transit at Greenwich, take in passing the meridian, and therefore serve to determine the Transit of the centre from an observed Transit of either limb.

#### *Eclipses. (Pages 429 to 443.)*

These pages contain all the particulars necessary for indicating the times, places, &c. on the Earth where the Eclipses of the Sun and Moon will be visible ; also the Elements which have been used in the calculations.



*Elements of Occultations.\** (Pages 444 to 454.)

These are:—1. The *Apparent* places at Greenwich Mean Midnight, of the Fixed Stars to the sixth magnitude inclusive, the occultations of which will take place above the horizon at Greenwich.

2. The *Apparent* Places of those Planets and *all* Stars to the fifth magnitude inclusive, the occultations of which will be visible at *some* part of the Earth.

3. The Greenwich Mean Time at which the Moon would, if viewed from the centre of the Earth, appear to have the same Right Ascension as the Star.

4. The difference of Declination and Position of the Moon, as it would appear with respect to the Star at the instant of conjunction in Right Ascension.

5. The parallels of Latitude *beyond* which the Star cannot be occulted by the Moon.

These Elements are useful in the calculation of an Occultation; for being referable to the Moon and Star, as seen from the centre of the Earth, they are independent of geographical position, and serve equally for all places. It is only necessary to apply the difference of longitude from Greenwich to the Greenwich Mean Time of conjunction, to find the time of conjunction at any other meridian; and it is this time to which the positions of the Moon and Star here given will equally correspond.

Thus, the position of the Moon and  $\gamma$  Libræ for 1870, Aug. 4, 16<sup>h</sup> 29<sup>m</sup> 57<sup>s</sup>, Mean Time at Greenwich, is the position at 16<sup>h</sup> 39<sup>m</sup> 17<sup>s</sup>·6 Mean Time at Paris, because Paris is 9<sup>m</sup> 20<sup>s</sup>·6 east of Greenwich.

By Limiting Parallels are to be understood those parallels of latitude beyond which an occultation cannot *possibly* occur.

Suppose an observer situate at a star, and having the Moon between him and the Earth, and that he could see the Moon projected on the Earth's disc; he would observe it moving across the disc from west to east, covering a zone whose breadth would be equal to the apparent diameter of the Moon. Now it is only within the limits of this zone that the Occultation of a Star by the Moon can take place. To all the places through which the boundary lines pass, the Star will appear just to touch the Moon's limb; and that projected parallel of latitude, to which one of the boundary lines is a tangent, is one of the limiting parallels, while the intersection of the other boundary line with the circumference of the Earth's disc determines the other limiting parallel.

Limiting Parallels are useful to indicate whether at a given conjunction of a Star with the Moon, the positions are likely to produce an occultation in a given latitude, and thus to save considerable labour to the computer.

Thus, suppose from the times of conjunction commencing at Aug. 16, 19<sup>h</sup> 4<sup>m</sup> 54<sup>s</sup>, page 451, it were required to prepare a list of Occultations for Greenwich, whose latitude is 51° 28' 38" N. On looking down the column of Limiting Parallels we reject at once the first star, because the Limiting Parallels do not comprise the parallel of Greenwich. On Aug. 17, we see that  $\xi$  Ceti may

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\* The calculation of the circumstances of an Occultation for any particular place may be made in the manner directed by Mr. Woolhouse in the Appendix to the *Nautical Almanac* for 1836; or approximately, with sufficient accuracy to suit the ordinary purposes of prediction, by Captain SHADWELL'S "Tables for facilitating the approximate prediction of Occultations and Eclipses for any particular place." Potter: Poultry, London.



either case being the same as those adopted for the eclipses. "D." denotes the disappearance of the Satellite behind the disc of Jupiter, and "R." its reappearance; "I." signifies the ingress, or beginning of a transit of a Satellite, or its shadow, across the disc of Jupiter, and "E." the egress, or termination.

*Jupiter's Satellites, Configurations (Pages 477 to 487).*

In addition to the explanation given at the foot of the page, it may be remarked that when two Satellites are in or near conjunction, instead of the usual symbol ( $\delta$ ), it has been thought better to place one above the other, without regard to their actual latitudes, but merely to distinguish them in their relation of *upper* and *lower*.

The Satellites are in the superior parts of their orbits, or have Jupiter between them and the Earth, when they are moving from West to East, or towards the right-hand of the page; but they are in the inferior parts of their orbits, or between the Earth and Jupiter, when they are moving from East to West, or towards the left-hand: in the former case Eclipses and Occultations occur, and in the latter Transits of the Satellites and their Shadows.

If an inverting telescope be directed towards Jupiter on January 27, at 8<sup>h</sup> mean time, the Satellites will appear to an observer at Greenwich in the positions as laid down in the table. The 1st and 2nd Satellites, which are *really* to the left of the planet, will appear to the right of it; and the 3rd and 4th, which are *really* to the right, will appear to be to the left.

*West* and *East*, at the head of the page, are inserted to show the positions of the Satellites with respect to Jupiter, as they would appear in a telescope that does *not* invert. Jupiter being always to the south of the zenith of Greenwich, the Satellites which are here laid down on the left of Jupiter would appear to the *West*, and those on the right-hand to the *East* of the planet.

As regards their positions to the east or west, the page viewed directly, exhibits the Satellites in an inverted order; but if the leaf be turned over, and the page viewed from the other side, they will appear in their real positions. The simplest mode of changing the position of a Satellite from apparent to real, and *vice versâ*, is to draw a line from the Satellite through Jupiter's centre, and to place the Satellite upon this line at the same distance from the centre as before, only on the opposite side. If this operation be performed upon the Configurations as laid down in this volume, the Satellites will be reduced to their real positions.

As the Configurations are given for *mean astronomical time*, which agrees with *civil time* only from 0<sup>h</sup> to 12<sup>h</sup>, or from noon to midnight, when the time exceeds 12<sup>h</sup> the excess will indicate the civil time of the succeeding day of the month.

Thus in August, 1870, the Configurations are given for 15<sup>h</sup> 0<sup>m</sup> mean time, but the 15th hour from noon is the same as the 3rd hour from the following midnight, when a new civil day has commenced. The appearances, therefore, relate to 3<sup>h</sup> 0<sup>m</sup> A.M. of the day following, according to the common mode of reckoning time; that is, the Configurations for August 26, 15<sup>h</sup> 0<sup>m</sup> relate to 3<sup>h</sup> 0<sup>m</sup> A.M. on August the 27th.

The Configurations enable an observer to distinguish the Satellites from each other, and from Stars in the vicinity of Jupiter.



*Phænomena.* (Pages 488 to 490.)

In these are given the conjunctions in Right Ascension of the Planets with the Moon and with each other, and the conjunctions in Right Ascension and Declination of the Planets with certain Stars; also the times when the Planets are in those parts of their orbits most favourable for observation, with a view to the more accurate determination of their elements; and other notices, chiefly of use to the astronomer.

*Saturn's Ring.* (Page 491.)

In this page are given the quantities which enable us to determine the position of the Ring of Saturn at intervals of 20 days throughout the year, and whether it be visible or not. The value of  $p$  shows the position of the minor axis of the Ring with respect to a circle of declination, those of  $a', b', a'', b''$ , the Ring's apparent magnitude, and a comparison of those of  $l$  and  $l'$ , its visibility or otherwise. For the plane of the Ring to be *visible*, it is necessary that the Sun and the Earth should be elevated on the same side of it, which is the case throughout the year 1870. The circumstances which determine the *invisibility* of the Ring are, 1st, when its plane passes through the centre of the Sun, or  $l' = 0$ ; 2nd, when it passes through the centre of the Earth, or  $l = 0$ , and at this time  $b'$  and  $b''$ , also  $= 0$ ; 3rd, when the Sun and Earth are on different sides of the plane of the Ring, for the Earth in this case will have the unilluminated side of the Ring turned towards it.

*Moon's Libration, &c.* (Pages 492 and 493.)

Page 492 contains the *Approximate Mean Time of the greatest Libration of the Moon's Apparent Disc*; and the *Illuminated portion of the Discs of Venus and Mars* at the middle of each month, and page 493, data for facilitating the computation of the *Libration in Longitude and Latitude* at any time required. See NAUTICAL ALMANAC 1867-1869, PREFACE, page x.

*Tides.* (Pages 494 to 497.)

The Mean Time of High Water at London Bridge is here given for every day of the year, on the assumption that the time of high water on full and change days, or the *Establishment of the Port*, is  $2^h 7^m$ . The first high tide which happens after Mean Noon of any day is inserted in the 1st column, and the second in the 2nd column. Where a line (—) is inserted, it indicates that there is only *one* high tide on that day. Thus on February 12 there is only one high tide; it occurs at  $11^h 27^m$ , but the succeeding high tide does not take place until  $1^m$  after mean noon of February 13.

The times of high water at full and change of the Moon, as given at pages 496 and 497, are reckoned from *Apparent Noon*: they represent the *Establishments of the Ports*, that is, the *actual times* of High Water *when the Moon passes the meridian at the same time as the Sun*; or the *intervals* between the times of Transit of the Moon and the times of High Water *on full and change days*. They serve to determine the time of high water on any other day at those places in the usual manner.

This Table is occasionally revised by the Admiralty Hydrographic Office.

*Tables.* (Pages 498 to 514.)

In page 498 is given a Table showing the Correction required on account of Second Differences in finding the Greenwich Time corresponding to a reduced



Lunar Distance—the use of this Table has been sufficiently explained, by the Examples given at pages 525 and 526.

Pages 499 and 500 contain a Table of three quantities used in computing the Moon's Libration. See NAUTICAL ALMANACS 1867–1869, PREFACE, page x.

In pages 501 to 503 are given Tables for determining the Latitude by Observations of the Pole Star out of the Meridian. The method of using them is as follows:

From the observed altitude, when corrected for the error of the instrument, refraction, and dip of the horizon, subtract 1'.

Reduce the Mean Time of Observation at the place to the corresponding Sidereal Time, by the Table given at page 504.—(See *Tables of Time Equivalents*, following this article.)

With the Sidereal Time found, take out the *first correction*, with its proper sign. If the sign be +, the correction must be *added* to the reduced altitude; but if it be —, it must be *subtracted*; in either case the result will give an Approximate Latitude.

With the Altitude and Sidereal Time of observation, take out the *second correction*; and with the day of the month and the same Sidereal time, take out the *third correction*. These two corrections *added* to the Approximate Latitude, will give the Latitude of the place.

*Example.* On March 6th, 1870, in Longitude 37° W. at 7<sup>h</sup> 43<sup>m</sup> 35<sup>s</sup> P.M. Mean civil Time, suppose the altitude of the Pole Star, when corrected for the error of the instrument, refraction, and dip of the horizon, to be 46° 17' 28": Required the latitude.

Mean Time	- - - - -	<sup>h</sup> <sup>m</sup> <sup>s</sup>	7 43 35
Diff. Long. (37°) in time	- - - - -		2 28 0
Greenwich Mean Time	- - - - -		10 11 35
Sidereal Time at Greenwich Mean Noon	- - - - -	<sup>h</sup> <sup>m</sup> <sup>s</sup>	22 56 4
Mean Time at Place	- - - - -		7 43 35
Acceleration (Tab. page 504) for 10 <sup>h</sup> 12 <sup>m</sup>	- - - - -		1 41
Sidereal Time of Observation	- - - - -		6 41 20
Corrected Altitude	- - - - -	<sup>°</sup> <sup>'</sup> <sup>"</sup>	46 17 28
Subtract	- - - - -		1 0
Reduced Altitude	- - - - -		46 16 28
With Argument 6 <sup>h</sup> 41 <sup>m</sup> 20 <sup>s</sup> , First Correction—	- - - - -		0 10 43
Approximate Latitude	- - - - -		46 5 45
Arguments, 46° 17' } Second Correction	- - - - -		+1 2
6 <sup>h</sup> 41 <sup>m</sup> }	- - - - -		
Arguments, March 6, 1870. } Third Correction	- - - - -		+1 7
6 <sup>h</sup> 41 <sup>m</sup> }	- - - - -		
Latitude of the place	- - - - -	N. 46	7 54



The *Tables of Time Equivalents*, given at pages 504 to 507, are useful for converting Mean Time into Sidereal Time, and Sidereal into Mean Time, agreeably to the example annexed to each table. They will serve also for Tables of Acceleration and Retardation, by taking the difference between each argument and its equivalent. Thus, in the Table at pages 504 and 505, the *excess* of the sidereal time equivalents above the arguments of mean time shows the *acceleration* of sidereal on mean solar intervals; and in the Table at pages 506 and 507, the *defect* of the mean time equivalents, as compared with the arguments of sidereal time, indicates the *retardation* of mean on sidereal intervals.

The concluding Table, at pages 508 to 514, contains a revised list of the *Latitudes and Longitudes of the principal Public and Private Observatories*.

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**APPENDIX**

**TO**

**THE NAUTICAL ALMANAC,**

**FOR THE YEAR**

**1870.**



## ADVERTISEMENT.

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WITH the NAUTICAL ALMANACS for the Years 1862 to 1869, there was issued a separate Supplement, containing, with other matter, Approximate Ephemerides of most of the newly discovered Minor Planets for the Years 1859 to 1866 respectively, but they were in many cases unavoidably *less* approximate than the similar ones published in the BERLINER ASTRONOMISCHES JAHRBUCH.

Professor FOERSTER having announced intended improvements in the Minor Planet section of that work, it has been considered unnecessary to continue the Supplement to the NAUTICAL ALMANAC.

An Appendix is substituted, containing in the present case the usual Ephemerides of Ceres, Pallas, Juno, Vesta, and Astræa for the Years 1867, 1868, 1869, and 1870 ; similar Ephemerides for 1871 will be given with the NAUTICAL ALMANAC for that Year.

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MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.	Passage.	Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 15 <sup>m</sup> 0 <sup>s</sup> 9	<sup>°</sup> S. 9 <sup>'</sup> 28	0 <sup>.</sup> 4870	<sup>h</sup> 20 <sup>m</sup> 16 <sup>s</sup> 1	<sup>°</sup> 207 32	<sup>°</sup> N. 8 32	0 <sup>.</sup> 4214
11	15 15 <sup>.</sup> 1	10 25	0 <sup>.</sup> 4716	19 50 <sup>.</sup> 9	209 53	8 17	0 <sup>.</sup> 4226
21	15 28 <sup>.</sup> 5	11 13	0 <sup>.</sup> 4546	19 24 <sup>.</sup> 8	212 13	8 0	0 <sup>.</sup> 4238
31	15 40 <sup>.</sup> 9	11 54	0 <sup>.</sup> 4360	18 57 <sup>.</sup> 8	214 32	7 43	0 <sup>.</sup> 4250
Feb. 10	15 52 <sup>.</sup> 1	12 26	0 <sup>.</sup> 4158	18 29 <sup>.</sup> 5	216 50	7 25	0 <sup>.</sup> 4263
20	16 1 <sup>.</sup> 8	12 51	0 <sup>.</sup> 3943	17 59 <sup>.</sup> 7	219 7	7 6	0 <sup>.</sup> 4275
Mar. 2	16 9 <sup>.</sup> 8	13 10	0 <sup>.</sup> 3717	17 28 <sup>.</sup> 2	221 23	6 47	0 <sup>.</sup> 4288
12	16 15 <sup>.</sup> 8	13 22	0 <sup>.</sup> 3483	16 54 <sup>.</sup> 7	223 38	6 28	0 <sup>.</sup> 4301
22	16 19 <sup>.</sup> 5	13 29	0 <sup>.</sup> 3248	16 18 <sup>.</sup> 9	225 52	6 8	0 <sup>.</sup> 4314
Apr. 1	16 20 <sup>.</sup> 6	13 33	0 <sup>.</sup> 3021	15 40 <sup>.</sup> 5	228 5	5 47	0 <sup>.</sup> 4327
11	16 19 <sup>.</sup> 0	13 34	0 <sup>.</sup> 2811	14 59 <sup>.</sup> 4	230 18	5 26	0 <sup>.</sup> 4340
21	16 14 <sup>.</sup> 7	13 34	0 <sup>.</sup> 2632	14 15 <sup>.</sup> 7	232 29	5 5	0 <sup>.</sup> 4353
May 1	16 8 <sup>.</sup> 1	13 34	0 <sup>.</sup> 2496	13 29 <sup>.</sup> 7	234 40	4 43	0 <sup>.</sup> 4366
11	15 59 <sup>.</sup> 7	13 35	0 <sup>.</sup> 2419	12 41 <sup>.</sup> 9	236 49	4 22	0 <sup>.</sup> 4379
21	15 50 <sup>.</sup> 3	13 39	0 <sup>.</sup> 2408	11 53 <sup>.</sup> 3	238 58	4 0	0 <sup>.</sup> 4392
31	15 41 <sup>.</sup> 1	13 48	0 <sup>.</sup> 2465	11 4 <sup>.</sup> 8	241 5	3 37	0 <sup>.</sup> 4406
June 10	15 32 <sup>.</sup> 9	14 4	0 <sup>.</sup> 2584	10 17 <sup>.</sup> 4	243 12	3 15	0 <sup>.</sup> 4419
20	15 26 <sup>.</sup> 6	14 26	0 <sup>.</sup> 2756	9 31 <sup>.</sup> 9	245 18	2 52	0 <sup>.</sup> 4432
30	15 22 <sup>.</sup> 5	14 55	0 <sup>.</sup> 2967	8 48 <sup>.</sup> 7	247 23	2 30	0 <sup>.</sup> 4444
July 10	15 21 <sup>.</sup> 0	15 31	0 <sup>.</sup> 3202	8 7 <sup>.</sup> 9	249 28	2 7	0 <sup>.</sup> 4457
20	15 21 <sup>.</sup> 9	16 14	0 <sup>.</sup> 3450	7 29 <sup>.</sup> 6	251 31	1 44	0 <sup>.</sup> 4470
30	15 25 <sup>.</sup> 2	17 2	0 <sup>.</sup> 3702	6 53 <sup>.</sup> 6	253 34	1 22	0 <sup>.</sup> 4482
Aug. 9	15 30 <sup>.</sup> 6	17 53	0 <sup>.</sup> 3950	6 19 <sup>.</sup> 7	255 36	0 59	0 <sup>.</sup> 4494
19	15 37 <sup>.</sup> 9	18 47	0 <sup>.</sup> 4190	5 47 <sup>.</sup> 7	257 37	0 36	0 <sup>.</sup> 4507
29	15 46 <sup>.</sup> 9	19 42	0 <sup>.</sup> 4418	5 17 <sup>.</sup> 3	259 38	N. 0 14	0 <sup>.</sup> 4518
Sept. 8	15 57 <sup>.</sup> 3	20 37	0 <sup>.</sup> 4632	4 48 <sup>.</sup> 4	261 38	S. 0 9	0 <sup>.</sup> 4530
18	16 9 <sup>.</sup> 1	21 30	0 <sup>.</sup> 4831	4 20 <sup>.</sup> 8	263 37	0 31	0 <sup>.</sup> 4542
28	16 22 <sup>.</sup> 0	22 21	0 <sup>.</sup> 5014	3 54 <sup>.</sup> 4	265 36	0 53	0 <sup>.</sup> 4553
Oct. 8	16 35 <sup>.</sup> 9	23 9	0 <sup>.</sup> 5180	3 29 <sup>.</sup> 0	267 34	1 15	0 <sup>.</sup> 4564
18	16 50 <sup>.</sup> 7	23 52	0 <sup>.</sup> 5329	3 4 <sup>.</sup> 4	269 31	1 37	0 <sup>.</sup> 4575
28	17 6 <sup>.</sup> 3	24 30	0 <sup>.</sup> 5462	2 40 <sup>.</sup> 6	271 29	1 59	0 <sup>.</sup> 4586
Nov. 7	17 22 <sup>.</sup> 5	25 2	0 <sup>.</sup> 5577	2 17 <sup>.</sup> 4	273 25	2 20	0 <sup>.</sup> 4596
17	17 39 <sup>.</sup> 2	25 28	0 <sup>.</sup> 5674	1 54 <sup>.</sup> 7	275 21	2 41	0 <sup>.</sup> 4606
27	17 56 <sup>.</sup> 4	25 47	0 <sup>.</sup> 5756	1 32 <sup>.</sup> 5	277 17	3 2	0 <sup>.</sup> 4616
Dec. 7	18 13 <sup>.</sup> 9	25 59	0 <sup>.</sup> 5820	1 10 <sup>.</sup> 6	279 12	3 22	0 <sup>.</sup> 4625
17	18 31 <sup>.</sup> 5	26 3	0 <sup>.</sup> 5867	0 48 <sup>.</sup> 9	281 7	3 43	0 <sup>.</sup> 4634
27	18 49 <sup>.</sup> 3	26 1	0 <sup>.</sup> 5897	0 27 <sup>.</sup> 3	283 1	4 3	0 <sup>.</sup> 4643
37	19 7 <sup>.</sup> 0	S. 25 51	0 <sup>.</sup> 5910	0 5 <sup>.</sup> 6	284 55	S. 4 22	0 <sup>.</sup> 4652



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>"</sup>
Apr. 11	16 18 49.13	16 18 29.70	0.78	13 34 9.1	13 34 8.9	0.0	4.7
13	16 18 8.67	16 17 46.08	0.91	13 34 8.1	13 34 6.7	0.0	4.7
						+	
15	16 17 21.94	16 16 56.26	1.04	13 34 4.9	13 34 2.6	0.1	4.8
17	16 16 29.06	16 16 0.36	1.16	13 34 0.0	13 33 57.2	0.1	4.8
19	16 15 30.17	16 14 58.52	1.29	13 33 54.3	13 33 51.3	0.1	4.9
21	16 14 25.42	16 13 50.91	1.41	13 33 48.4	13 33 45.5	0.1	4.9
23	16 13 15.01	16 12 37.74	1.52	13 33 42.7	13 33 40.3	0.1	4.9
25	16 11 59.13	16 11 19.21	1.63	13 33 38.0	13 33 36.2	0.1	5.0
27	16 10 38.03	16 9 55.61	1.74	13 33 34.8	13 33 34.1	0.0	5.0
29	16 9 12.00	16 8 27.23	1.84	13 33 34.0	13 33 34.7	0.0	5.0
						—	
May 1	16 7 41.34	16 6 54.40	1.93	13 33 36.2	13 33 38.7	0.1	5.0
3	16 6 6.44	16 5 17.51	2.02	13 33 42.2	13 33 46.9	0.2	5.1
5	16 4 27.67	16 3 36.97	2.09	13 33 52.8	13 34 0.1	0.3	5.1
7	16 2 45.47	16 1 53.22	2.16	13 34 8.8	13 34 19.0	0.4	5.1
9	16 1 0.28	16 0 6.72	2.22	13 34 30.9	13 34 44.5	0.5	5.1
11	15 59 12.58	15 58 17.93	2.26	13 34 59.9	13 35 17.3	0.7	5.1
13	15 57 22.84	15 56 27.37	2.30	13 35 36.8	13 35 58.4	0.9	5.1
15	15 55 31.55	15 54 35.47	2.33	13 36 22.3	13 36 48.4	1.0	5.1
17	15 53 39.16	15 52 42.70	2.35	13 37 16.9	13 37 48.0	1.2	5.1
19	15 51 46.14	15 50 49.54	2.36	13 38 21.5	13 38 57.7	1.5	5.1
21	15 49 52.97	15 48 56.48	2.36	13 39 36.6	13 40 18.4	1.7	5.1
23	15 48 0.12	15 47 3.97	2.34	13 41 3.0	13 41 50.7	1.9	5.1
25	15 46 8.08	15 45 12.50	2.32	13 42 41.4	13 43 35.2	2.2	5.1
27	15 44 17.32	15 43 22.58	2.29	13 44 32.4	13 45 32.9	2.5	5.1
29	15 42 28.33	15 41 34.64	2.25	13 46 36.8	13 47 44.2	2.7	5.1
31	15 40 41.57	15 39 49.17	2.20	13 48 55.3	13 50 9.9	3.0	5.1
June 2	15 38 57.50	15 38 6.62	2.14	13 51 28.4	13 52 50.7	3.4	5.0
4	15 37 16.56	15 36 27.38	2.07	13 54 16.8	13 55 46.8	3.7	5.0
6	15 35 39.15	15 34 51.89	1.99	13 57 21.0	13 58 59.2	4.0	5.0
8	15 34 5.65	15 33 20.47	1.90	14 0 41.5	14 2 27.9	4.3	5.0
10	15 32 36.38	15 31 53.42	1.81	14 4 18.5	14 6 13.3	4.7	4.9
12	15 31 11.63	15 30 31.03	1.71	14 8 12.4	14 10 15.8	5.1	4.9
14	15 29 51.65	15 29 13.52	1.61	14 12 23.5	14 14 35.4	5.4	4.9
16	15 28 36.68	15 28 1.14	1.51	14 16 51.7	14 19 12.4	5.8	4.8
18	15 27 26.92	15 26 54.06	1.40	14 21 37.4	14 24 6.7	6.1	4.8
20	15 26 22.56	15 25 52.44	1.28	14 26 40.4	14 29 18.4	6.5	4.7
22	15 25 23.72	15 24 56.42	1.17	14 32 0.7	14 34 47.4	6.9	4.7
24	15 24 30.55	15 24 6.13	1.05	14 37 38.4	14 40 33.6	7.2	4.7
26	15 23 43.17	15 23 21.67	0.93	14 43 33.2	14 46 37.0	7.6	4.6
28	15 23 1.66	15 22 43.14	0.80	14 49 45.2	14 52 57.5	7.9	4.6
30	15 22 26.12	15 22 10.61	0.68	14 56 14.1	14 59 34.8	8.3	4.5



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	—	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	—	<sup>"</sup>
July 2	15 21 56.61	15 21 44.12	0.56	15 2 59.7	15 6 28.7	8.6	4.5
4	15 21 33.15	15 21 23.70	0.43	15 10 1.8	15 13 38.9	9.0	4.4
6	15 21 15.78	15 21 9.36	0.30	15 17 20.0	15 21 5.1	9.3	4.4
8	15 21 4.44	15 21 1.02	0.17	15 24 54.0	15 28 46.8	9.6	4.4
10	15 20 59.08	15 20 58.63	0.05	15 32 43.4	15 36 43.6	9.9	4.3
			+				
12	15 20 59.66	15 21 2.15	0.07	15 40 47.4	15 44 54.8	10.2	4.3
14	15 21 6.10	15 21 11.50	0.19	15 49 5.8	15 53 20.1	10.5	4.2
16	15 21 18.33	15 21 26.59	0.31	15 57 37.9	16 1 58.9	10.8	4.2
18	15 21 36.26	15 21 47.34	0.43	16 6 23.1	16 10 50.4	11.1	4.1
20	15 21 59.81	15 22 13.67	0.55	16 15 20.7	16 19 54.0	11.3	4.0
22	15 22 28.90	15 22 45.49	0.66	16 24 30.3	16 29 9.3	11.6	3.9
24	15 23 3.43	15 23 22.71	0.78	16 33 51.1	16 38 35.6	11.8	3.9
26	15 23 43.32	15 24 5.25	0.89	16 43 22.7	16 48 12.4	12.0	3.8
28	15 24 28.48	15 24 53.02	1.00	16 53 4.7	16 57 59.3	12.2	3.8
30	15 25 18.85	15 25 45.95	1.10	17 2 56.3	17 7 55.5	12.4	3.8
Aug. 1	15 26 14.32	15 26 43.93	1.21	17 12 56.9	17 18 0.5	12.6	3.7
3	15 27 14.77	15 27 46.84	1.31	17 23 6.1	17 28 13.6	12.8	3.7
5	15 28 20.11	15 28 54.57	1.41	17 33 23.0	17 38 34.2	12.9	3.6
7	15 29 30.21	15 30 7.00	1.51	17 43 47.2	17 49 1.7	13.1	3.6
9	15 30 44.94	15 31 24.00	1.60	17 54 17.8	17 59 35.3	13.2	3.6
11	15 32 4.18	15 32 45.46	1.70	18 4 54.1	18 10 14.3	13.3	3.5
13	15 33 27.82	15 34 11.25	1.79	18 15 35.7	18 20 58.2	13.4	3.5
15	15 34 55.75		1.88	18 26 21.7		13.5	3.4



# ① CERES, 1868.

## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.	Passage.	Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 18 <sup>m</sup> 58.2	<sup>°</sup> S. 25 <sup>'</sup> 57	0.5906	<sup>h</sup> 20 <sup>m</sup> 16.4	<sup>°</sup> 283 58	<sup>°</sup> S. 4 12	0.4647
11	19 15.9	25 44	0.5911	23 52.6	285 52	4 32	0.4656
21	19 33.5	25 24	0.5899	23 30.7	287 45	4 51	0.4664
31	19 50.8	25 0	0.5870	23 8.6	289 38	5 9	0.4672
Feb. 10	20 7.8	24 30	0.5825	22 46.2	291 31	5 27	0.4679
20	20 24.3	23 56	0.5763	22 23.3	293 24	5 45	0.4686
Mar. 1	20 40.4	23 20	0.5684	22 0.0	295 16	6 3	0.4693
11	20 56.0	22 42	0.5589	21 36.1	297 8	6 20	0.4699
21	21 10.9	22 3	0.5477	21 11.5	299 0	6 36	0.4705
31	21 25.1	21 25	0.5349	20 46.3	300 52	6 52	0.4711
Apr. 10	21 38.5	20 50	0.5205	20 20.3	302 44	7 8	0.4716
20	21 51.0	20 18	0.5045	19 53.3	304 35	7 23	0.4721
30	22 2.6	19 52	0.4871	19 25.4	306 27	7 37	0.4726
May 10	22 13.0	19 33	0.4682	18 56.4	308 18	7 51	0.4730
20	22 22.2	19 23	0.4481	18 26.1	310 9	8 5	0.4733
30	22 29.9	19 23	0.4271	17 54.3	312 0	8 18	0.4737
June 9	22 36.0	19 36	0.4055	17 21.0	313 51	8 30	0.4740
19	22 40.2	20 1	0.3837	16 45.7	315 42	8 42	0.4743
29	22 42.4	20 40	0.3626	16 8.4	317 34	8 54	0.4745
July 9	22 42.3	21 33	0.3429	15 28.8	319 25	9 5	0.4747
19	22 39.9	22 36	0.3257	14 47.0	321 16	9 15	0.4749
29	22 35.2	23 46	0.3122	14 2.9	323 7	9 25	0.4750
Aug. 8	22 28.5	24 57	0.3034	13 16.8	324 58	9 34	0.4751
18	22 20.4	26 2	0.3003	12 29.4	326 49	9 42	0.4751
28	22 11.8	26 55	0.3030	11 41.5	328 41	9 50	0.4751
Sept. 7	22 3.5	27 31	0.3115	10 54.0	330 32	9 58	0.4751
17	21 56.5	27 48	0.3249	10 7.8	332 23	10 4	0.4750
27	21 51.4	27 45	0.3422	9 23.5	334 15	10 10	0.4749
Oct. 7	21 48.7	27 25	0.3622	8 41.5	336 7	10 16	0.4747
17	21 48.4	26 51	0.3839	8 2.0	337 59	10 21	0.4745
27	21 50.4	26 4	0.4062	7 24.8	339 51	10 25	0.4743
Nov. 6	21 54.6	25 7	0.4284	6 49.7	341 43	10 28	0.4740
16	22 0.7	24 2	0.4500	6 16.6	343 36	10 31	0.4737
26	22 8.5	22 50	0.4705	5 45.0	345 28	10 34	0.4734
Dec. 6	22 17.6	21 32	0.4897	5 14.8	347 21	10 35	0.4730
16	22 27.9	20 9	0.5074	4 45.7	349 14	10 36	0.4726
26	22 39.1	18 41	0.5236	4 17.5	351 8	10 36	0.4722
36	22 51.0	S. 17 9	0.5380	3 50.1	353 1	S. 10 36	0.4717



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South. ° ' "	South. ° ' "	— " "	" "
July 16	22 40 37.60	22 40 18.69	0.76	22 20 1.8	22 26 37.2	16.4	4.2
18	22 39 58.38	22 39 36.70	0.87	22 33 17.1	22 40 1.3	16.8	4.2
20	22 39 13.65	22 38 49.25	0.99	22 46 49.5	22 53 41.4	17.1	4.3
22	22 38 23.51	22 37 56.45	1.10	23 0 36.6	23 7 34.8	17.4	4.3
24	22 37 28.09	22 36 58.45	1.21	23 14 35.7	23 21 38.8	17.6	4.3
26	22 36 27.55	22 35 55.42	1.31	23 28 43.8	23 35 50.4	17.7	4.4
28	22 35 22.07	22 34 47.53	1.41	23 42 58.2	23 50 6.7	17.8	4.4
30	22 34 11.83	22 33 35.00	1.51	23 57 15.7	24 4 24.7	17.9	4.4
Aug. 1	22 32 57.06	22 32 18.05	1.60	24 11 33.3	24 18 41.1	17.8	4.4
3	22 31 37.99	22 30 56.93	1.69	24 25 47.7	24 32 52.7	17.7	4.4
5	22 30 14.89	22 29 31.91	1.77	24 39 55.8	24 46 56.4	17.6	4.4
7	22 28 48.03	22 28 3.28	1.85	24 53 54.2	25 0 48.8	17.4	4.5
9	22 27 17.70	22 26 31.34	1.92	25 7 39.7	25 14 26.6	17.1	4.5
11	22 25 44.23	22 24 56.43	1.98	25 21 9.1	25 27 46.7	16.7	4.5
13	22 24 7.99	22 23 18.96	2.04	25 34 18.9	25 40 45.4	16.2	4.5
15	22 22 29.38	22 21 39.31	2.08	25 47 5.8	25 53 19.7	15.7	4.5
17	22 20 48.80	22 19 57.92	2.11	25 59 26.6	26 5 26.2	15.1	4.5
19	22 19 6.73	22 18 15.28	2.14	26 11 18.2	26 17 2.1	14.5	4.5
21	22 17 23.63	22 16 31.83	2.16	26 22 37.7	26 28 4.6	13.8	4.5
23	22 15 39.97	22 14 48.08	2.16	26 33 22.4	26 38 30.9	13.0	4.5
25	22 13 56.22	22 13 4.46	2.16	26 43 30.0	26 48 19.2	12.2	4.5
27	22 12 12.84	22 11 21.43	2.15	26 52 58.4	26 57 27.4	11.4	4.5
29	22 10 30.28	22 9 39.44	2.12	27 1 45.9	27 5 53.8	10.6	4.4
31	22 8 48.96	22 7 58.90	2.09	27 9 51.0	27 13 37.2	9.7	4.4
Sept. 2	22 7 9.31	22 6 20.25	2.06	27 17 12.4	27 20 36.2	8.7	4.4
4	22 5 31.74	22 4 43.86	2.01	27 23 48.8	27 26 50.6	7.8	4.4
6	22 3 56.65	22 3 10.17	1.95	27 29 39.8	27 32 17.9	6.8	4.4
8	22 2 24.45	22 1 39.52	1.89	27 34 44.4	27 36 59.2	5.9	4.4
10	22 0 55.47	22 0 12.32	1.82	27 39 2.3	27 40 53.7	4.9	4.3
12	21 59 30.12	21 58 48.92	1.74	27 42 33.4	27 44 1.3	3.9	4.3
14	21 58 8.75	21 57 29.65	1.65	27 45 17.5	27 46 21.9	2.9	4.3
16	21 56 51.67	21 56 14.83	1.56	27 47 14.7	27 47 55.9	2.0	4.2
18	21 55 39.18	21 55 4.74	1.46	27 48 25.7	27 48 44.0	1.0	4.2
20	21 54 31.54	21 53 59.62	1.36	27 48 51.0	27 48 46.8	0.1	4.2
22	21 53 29.00	21 52 59.70	1.25	27 48 31.6	27 48 5.4	+	4.1
24	21 52 31.74	21 52 5.14	1.14	27 47 28.4	27 46 40.7	1.8	4.0
26	21 51 39.92	21 51 16.09	1.02	27 45 42.5	27 44 33.9	2.6	4.0
28	21 50 53.66	21 50 32.64	0.91	27 43 15.1	27 41 46.2	3.5	4.0
30	21 50 13.05	21 49 54.89	0.79	27 40 7.3	27 38 18.7	4.3	3.9
Oct. 2	21 49 38.17	21 49 22.90	0.67	27 36 20.4	27 34 12.8	5.1	3.9
4	21 49 9.07	21 48 56.69	0.55	27 31 55.8	27 29 29.6	5.9	3.9
6	21 48 45.77	21 48 36.30	0.42	27 26 54.4	27 24 10.5	6.6	3.9



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	+	"
Oct. 8	21 48 28.30	21 48 21.76	0.30	27 21 17.8	27 18 16.5	7.4	3.9
10	21 48 16.67	21 48 13.05	0.18	27 15 6.9	27 11 49.0	8.1	3.9
12	21 48 10.88	21 48 10.17	0.06	27 8 23.0	27 4 49.0	8.8	3.8
			+				
14	21 48 10.91	21 48 13.11	0.06	27 1 7.1	26 57 17.7	9.4	3.8
16	21 48 16.75	21 48 21.82	0.18	26 53 20.6	26 49 16.2	10.0	3.7
18	21 48 28.32	21 48 36.23	0.30	26 45 4.5	26 40 45.8	10.6	3.7
20	21 48 45.54	21 48 56.25	0.42	26 36 20.1	26 31 47.6	11.2	3.7
22	21 49 8.34	21 49 21.79	0.53	26 27 8.5	26 22 22.9	11.8	3.6
24	21 49 36.59	21 49 52.71	0.64	26 17 31.0	26 12 32.8	12.3	3.6
26	21 50 10.17	21 50 28.95	0.76	26 7 28.4	26 2 18.1	12.8	3.6
28	21 50 49.00	21 51 10.32	0.87	25 57 1.9	25 51 40.0	13.3	3.5
30	21 51 32.90	21 51 56.72	0.97	25 46 12.4	25 40 39.3	13.8	3.5
Nov. 1	21 52 21.76	21 52 48.01	1.07	25 35 0.6	25 29 16.6	14.2	3.4
3	21 53 15.45	21 53 44.06	1.17	25 23 27.4	25 17 32.9	14.7	3.4
5	21 54 13.83	21 54 44.75	1.26	25 11 33.4	25 5 28.9	15.1	3.3
7	21 55 16.80	21 55 49.97	1.36	24 59 19.4	24 53 5.1	15.5	3.3
9	21 56 24.25	21 56 59.62	1.45	24 46 46.1	24 40 22.4	15.9	3.3
11	21 57 36.06	21 58 13.56	1.54	24 33 54.0	24 27 21.1	16.3	3.2
13	21 58 52.10	21 59 31.68	1.63	24 20 43.7	24 14 1.9	16.7	3.2
15	22 0 12.27	22 0 53.86	1.71	24 7 15.7	24 0 25.3	17.0	3.2
17	22 1 36.43	22 2 19.95	1.79	23 53 30.7	23 46 32.0	17.4	3.1
19	22 3 4.42	22 3 49.81	1.87	23 39 29.3	23 32 22.7	17.7	3.1
21	22 4 36.10		1.95	23 25 12.3		18.0	3.1



MEAN TIME.

Month and Day <sub>A</sub>		Geocentric.				Heliocentric.			
		Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.	
		Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	
		<sup>h</sup> <sup>m</sup>	<sup>°</sup> <sup>'</sup>		<sup>h</sup> <sup>m</sup>	<sup>°</sup> <sup>'</sup>	<sup>°</sup> <sup>'</sup>		
Jan.	I	22 46.1	S. 17 47	0.5324	4 1.0	352 16	S. 10 36	0.4719	
	11	22 58.5	16 13	0.5459	3 33.9	354 9	10 35	0.4714	
	21	23 11.3	14 36	0.5576	3 7.4	356 3	10 34	0.4708	
Feb.	31	23 24.5	12 58	0.5676	2 41.3	357 58	10 32	0.4702	
	10	23 38.1	11 17	0.5759	2 15.5	359 52	10 29	0.4696	
	20	23 52.0	9 36	0.5825	1 49.9	1 47	10 25	0.4690	
Mar.	2	0 6.0	7 54	0.5874	1 24.6	3 42	10 21	0.4683	
	12	0 20.2	6 13	0.5907	0 59.4	5 38	10 16	0.4676	
	22	0 34.5	4 33	0.5924	0 34.3	7 33	10 10	0.4669	
Apr.	I	0 48.9	2 54	0.5925	0 9.3	9 29	10 3	0.4661	
	11	1 3.3	S. 1 18	0.5910	23 41.8	11 26	9 56	0.4653	
	21	1 17.7	N. 0 16	0.5879	23 16.9	13 23	9 48	0.4644	
May	I	1 32.1	1 46	0.5833	22 51.9	15 20	9 40	0.4636	
	11	1 46.5	3 12	0.5771	22 26.9	17 17	9 31	0.4627	
	21	2 0.7	4 33	0.5694	22 1.8	19 15	9 21	0.4618	
June	31	2 14.9	5 49	0.5601	21 36.5	21 14	9 10	0.4608	
	10	2 28.8	7 0	0.5492	21 11.0	23 13	8 59	0.4598	
	20	2 42.4	8 4	0.5367	20 45.2	25 12	8 47	0.4588	
July	30	2 55.6	9 3	0.5227	20 19.0	27 11	8 34	0.4578	
	10	3 8.4	9 55	0.5070	19 52.4	29 11	8 21	0.4567	
	20	3 20.5	10 40	0.4896	19 25.1	31 12	8 7	0.4556	
Aug.	30	3 31.9	11 18	0.4706	18 57.0	33 13	7 52	0.4545	
	9	3 42.3	11 49	0.4501	18 27.9	35 14	7 37	0.4534	
	19	3 51.5	12 14	0.4281	17 57.7	37 16	7 21	0.4523	
Sept.	29	3 59.3	12 32	0.4048	17 26.0	39 19	7 4	0.4511	
	8	4 5.3	12 44	0.3804	16 52.5	41 22	6 47	0.4500	
	18	4 9.3	12 50	0.3556	16 17.0	43 25	6 29	0.4488	
Oct.	28	4 11.0	12 52	0.3309	15 39.2	45 29	6 10	0.4476	
	8	4 10.1	12 50	0.3072	14 58.9	47 34	5 51	0.4463	
	18	4 6.5	12 46	0.2860	14 15.9	49 39	5 31	0.4451	
Nov.	28	4 0.5	12 40	0.2684	13 30.4	51 44	5 11	0.4439	
	7	3 52.3	12 35	0.2562	12 42.9	53 50	4 51	0.4426	
	17	3 42.9	12 34	0.2504	11 54.1	55 57	4 30	0.4414	
Dec.	27	3 33.2	12 37	0.2516	11 5.1	58 5	4 8	0.4401	
	7	3 24.2	12 47	0.2598	10 17.0	60 13	3 45	0.4389	
	17	3 17.1	13 6	0.2738	9 30.7	62 22	3 23	0.4376	
	27	3 12.3	13 34	0.2924	8 46.7	64 31	3 0	0.4363	
	37	3 10.2	N. 14 11	0.3140	8 5.4	66 41	S. 2 36	0.4351	



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	North. ° ' "	North. ° ' "	—	"
Oct. 8	4 9 55.99	4 9 40.99	0.59	12 49 52.0	12 49 30.3	0.9	4.4
10	4 9 24.39	4 9 6.20	0.72	12 49 7.2	12 48 42.8	1.0	4.4
12	4 8 46.43	4 8 25.09	0.86	12 48 17.2	12 47 50.5	1.1	4.5
14	4 8 2.19	4 7 37.73	0.99	12 47 22.7	12 46 54.0	1.2	4.5
16	4 7 11.72	4 6 44.18	1.12	12 46 24.5	12 45 54.2	1.2	4.6
18	4 6 15.12	4 5 44.56	1.24	12 45 23.2	12 44 51.6	1.3	4.6
20	4 5 12.50	4 4 38.98	1.37	12 44 19.6	12 43 47.2	1.3	4.6
22	4 4 4.00	4 3 27.60	1.49	12 43 14.5	12 42 41.6	1.4	4.7
24	4 2 49.80	4 2 10.61	1.60	12 42 8.6	12 41 35.5	1.4	4.7
26	4 1 30.07	4 0 48.21	1.72	12 41 2.7	12 40 30.0	1.4	4.8
28	4 0 5.06	3 59 20.67	1.82	12 39 57.7	12 39 25.7	1.3	4.8
30	3 58 35.07	3 57 48.29	1.92	12 38 54.4	12 38 23.6	1.3	4.9
Nov. 1	3 57 0.39	3 56 11.40	2.02	12 37 53.7	12 37 24.7	1.2	4.9
3	3 55 21.38	3 54 30.38	2.10	12 36 56.8	12 36 30.1	1.1	4.9
5	3 53 38.45	3 52 45.65	2.18	12 36 4.7	12 35 40.7	1.0	5.0
7	3 51 52.03	3 50 57.66	2.25	12 35 18.4	12 34 57.8	0.9	5.0
9	3 50 2.59	3 49 6.89	2.31	12 34 39.1	12 34 22.5	0.7	5.0
11	3 48 10.63	3 47 13.85	2.36	12 34 8.1	12 33 55.9	0.5	5.0
13	3 46 16.62	3 45 19.00	2.39	12 33 46.2	12 33 39.1	0.3	5.0
15	3 44 21.05	3 43 22.85	2.42	12 33 34.7	12 33 33.1	0.1	5.0
17	3 42 24.45	3 41 25.92	2.44	12 33 34.4	12 33 38.9	0.1	5.0
19	3 40 27.32	3 39 28.71	2.44	12 33 46.5	12 33 57.4	0.4	5.0
21	3 38 30.16	3 37 31.74	2.44	12 34 11.8	12 34 29.7	0.7	5.0
23	3 36 33.50	3 35 35.52	2.42	12 34 51.2	12 35 16.5	1.0	5.0
25	3 34 37.85	3 33 40.57	2.39	12 35 45.8	12 36 19.1	1.3	5.0
27	3 32 43.73	3 31 47.40	2.36	12 36 56.5	12 37 38.2	1.6	5.0
29	3 30 51.65	3 29 56.54	2.31	12 38 24.3	12 39 14.9	2.0	5.0
Dec. 1	3 29 2.12	3 28 8.46	2.25	12 40 10.1	12 41 10.0	2.4	5.0
3	3 27 15.63	3 26 23.68	2.18	12 42 14.7	12 43 24.3	2.8	4.9
5	3 25 32.66	3 24 42.63	2.11	12 44 38.9	12 45 58.7	3.2	4.9
7	3 23 53.65	3 23 5.74	2.02	12 47 23.6	12 48 53.7	3.6	4.9
9	3 22 18.98	3 21 33.41	1.92	12 50 29.2	12 52 10.0	4.1	4.9
11	3 20 49.06	3 20 5.97	1.82	12 53 56.1	12 55 47.8	4.5	4.9
13	3 19 24.17	3 18 43.70	1.71	12 57 44.9	12 59 47.5	5.0	4.8
15	3 18 4.59	3 17 26.87	1.60	13 1 55.7	13 4 9.5	5.5	4.8
17	3 16 50.57	3 16 15.71	1.48	13 6 28.7	13 8 53.6	5.9	4.8
19	3 15 42.32	3 15 10.41	1.36	13 11 24.0	13 13 59.9	6.4	4.8
21	3 14 40.01	3 14 11.15	1.23	13 16 41.4	13 19 28.4	6.8	4.7
23	3 13 43.82	3 13 18.07	1.10	13 22 20.9	13 25 18.9	7.3	4.7
25	3 12 53.89	3 12 31.30	0.97	13 28 22.4	13 31 31.3	7.8	4.7
27	3 12 10.32	3 11 50.95	0.84	13 34 45.6	13 38 5.5	8.2	4.6
29	3 11 33.22	3 11 17.12	0.70	13 41 30.7	13 45 1.2	8.7	4.6
31	3 11 2.66	3 10 49.85	0.57	13 48 37.1	13 52 18.3	9.1	4.5



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 3 10.9	N. 13 51	0.3028	h m 8 25.7	° ' / 65 36	S. 2 48	0.4357
11	3 10.2	14 32	0.3255	7 45.8	67 46	2 24	0.4345
21	3 12.1	15 21	0.3491	7 8.5	69 57	2 0	0.4332
31	3 16.6	16 16	0.3727	6 33.7	72 9	1 36	0.4320
Feb. 10	3 23.3	17 15	0.3957	6 1.1	74 22	1 11	0.4307
20	3 31.9	18 17	0.4175	5 30.4	76 35	0 47	0.4295
Mar. 2	3 42.3	19 20	0.4380	5 1.4	78 48	S. 0 22	0.4283
12	3 54.3	20 22	0.4569	4 34.0	81 3	N. 0 4	0.4271
22	4 7.5	21 23	0.4741	4 7.9	83 18	0 29	0.4259
Apr. 1	4 21.9	22 20	0.4897	3 43.0	85 34	0 54	0.4247
11	4 37.4	23 13	0.5035	3 19.1	87 51	1 20	0.4236
21	4 53.7	24 0	0.5157	2 56.1	90 9	1 45	0.4225
May 1	5 10.8	24 42	0.5262	2 33.8	92 27	2 11	0.4214
11	5 28.6	25 16	0.5352	2 12.2	94 46	2 36	0.4203
21	5 46.9	25 42	0.5426	1 51.1	97 6	3 2	0.4192
31	6 5.7	26 0	0.5485	1 30.4	99 27	3 27	0.4182
June 10	6 24.8	26 9	0.5529	1 10.1	101 48	3 51	0.4173
20	6 44.1	26 10	0.5559	0 50.0	104 10	4 16	0.4163
30	7 3.6	26 2	0.5575	0 30.1	106 33	4 40	0.4154
July 10	7 23.1	25 46	0.5577	10 10.3	108 57	5 4	0.4146
20	7 42.6	25 21	0.5565	23 48.4	111 21	5 27	0.4138
30	8 2.0	24 48	0.5539	23 28.4	113 46	5 50	0.4130
Aug. 9	8 21.3	24 8	0.5499	23 8.2	116 12	6 13	0.4123
19	8 40.3	23 22	0.5445	22 47.8	118 39	6 34	0.4116
29	8 59.0	22 31	0.5377	22 27.0	121 6	6 55	0.4109
Sept. 8	9 17.3	21 35	0.5295	22 5.9	123 34	7 16	0.4103
18	9 35.2	20 36	0.5196	21 44.4	126 2	7 35	0.4098
28	9 52.7	19 35	0.5083	21 22.5	128 31	7 54	0.4093
Oct. 8	10 9.6	18 33	0.4954	21 0.0	131 0	8 12	0.4089
18	10 26.0	17 32	0.4810	20 36.9	133 30	8 29	0.4085
28	10 41.8	16 33	0.4649	20 13.2	136 1	8 46	0.4082
Nov. 7	10 56.8	15 39	0.4472	19 48.8	138 32	9 1	0.4080
17	11 11.0	14 51	0.4279	19 23.5	141 3	9 15	0.4078
27	11 24.2	14 12	0.4069	18 57.2	143 34	9 28	0.4077
Dec. 7	11 36.2	13 42	0.3845	18 29.8	146 6	9 40	0.4076
17	11 46.8	13 25	0.3608	18 0.9	148 38	9 51	0.4075
27	11 55.8	13 23	0.3361	17 30.4	151 10	10 1	0.4076
37	12 2.9	N. 13 36	0.3109	16 58.0	153 42	N. 10 10	0.4077



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	North.	North.	+	"
Jan. 1	3 10 49.85	3 10 38.68	0.50	13 52 18.3	13 56 4.7	9.3	4.5
3	3 10 29.18	3 10 21.33	0.36	13 59 56.2	14 3 52.9	9.8	4.4
5	3 10 15.14	3 10 10.59	0.23	14 7 54.6	14 12 1.4	10.2	4.4
7	3 10 7.68	3 10 6.42	0.09	14 16 13.0	14 20 29.5	10.6	4.3
			+				
9	3 10 6.78	3 10 8.77	0.05	14 24 50.8	14 29 16.7	11.0	4.3
11	3 10 12.36	3 10 17.56	0.18	14 33 47.2	14 38 22.2	11.4	4.2
13	3 10 24.35	3 10 32.72	0.32	14 43 1.5	14 47 45.2	11.7	4.2
15	3 10 42.65	3 10 54.13	0.45	14 52 33.1	14 57 25.0	12.1	4.1
17	3 11 7.15	3 11 21.70	0.57	15 2 21.0	15 7 20.9	12.4	4.1
19	3 11 37.76	3 11 55.33	0.70	15 12 24.6	15 17 32.1	12.7	4.1
21	3 12 14.37	3 12 34.89	0.82	15 22 43.1	15 27 57.7	13.0	4.0
23	3 12 56.87	3 13 20.30	0.95	15 33 15.7	15 38 37.1	13.1	4.0
25	3 13 45.17	3 14 11.47	1.07	15 44 1.7	15 49 29.4	13.6	3.9
27	3 14 39.18	3 15 8.29	1.18	15 55 0.3	16 0 34.2	13.9	3.9
29	3 15 38.78	3 16 10.65	1.30	16 6 11.0	16 11 50.5	14.1	3.8
31	3 16 43.88	3 17 18.46	1.41	16 17 32.8	16 23 17.7	14.3	3.8
Feb. 2	3 17 54.36	3 18 31.57	1.52	16 29 5.1	16 34 54.9	14.5	3.8
4	3 19 10.07	3 19 49.86	1.63	16 40 47.1	16 46 41.4	14.7	3.7
6	3 20 30.90	3 21 13.20	1.74	16 52 37.8	16 58 36.2	14.9	3.7
8	3 21 56.71	3 22 41.44	1.84	17 4 36.5	17 10 38.6	15.1	3.6
10	3 23 27.35	3 24 14.45	1.94	17 16 42.3	17 22 47.5	15.2	3.6
12	3 25 2.70		2.03	17 28 54.3		15.3	3.6



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vec
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	14 43 <sup>h</sup> 1 <sup>m</sup>	S. 0 40	0.4458	19 58 <sup>h</sup> 4 <sup>m</sup>	197 23	N. 16 7	0.3987
11	14 57 <sup>h</sup> 9 <sup>m</sup>	N. 0 7	0.4307	19 33 <sup>h</sup> 8 <sup>m</sup>	199 38	17 25	0.4031
21	15 11 <sup>h</sup> 7 <sup>m</sup>	1 13	0.4143	19 8 <sup>h</sup> 1 <sup>m</sup>	201 52	18 39	0.4074
31	15 24 <sup>h</sup> 2 <sup>m</sup>	2 37	0.3970	18 41 <sup>h</sup> 1 <sup>m</sup>	204 6	19 50	0.4117
Feb. 10	15 35 <sup>h</sup> 2 <sup>m</sup>	4 20	0.3792	18 12 <sup>h</sup> 6 <sup>m</sup>	206 19	20 58	0.4160
20	15 44 <sup>h</sup> 4 <sup>m</sup>	6 22	0.3614	17 42 <sup>h</sup> 2 <sup>m</sup>	208 31	22 4	0.4203
Mar. 2	15 51 <sup>h</sup> 5 <sup>m</sup>	8 42	0.3442	17 9 <sup>h</sup> 9 <sup>m</sup>	210 43	23 6	0.4244
12	15 56 <sup>h</sup> 3 <sup>m</sup>	11 16	0.3282	16 35 <sup>h</sup> 2 <sup>m</sup>	212 54	24 5	0.4286
22	15 58 <sup>h</sup> 6 <sup>m</sup>	14 0	0.3144	15 58 <sup>h</sup> 0 <sup>m</sup>	215 5	25 1	0.4327
Apr. 1	15 58 <sup>h</sup> 2 <sup>m</sup>	16 48	0.3037	15 18 <sup>h</sup> 1 <sup>m</sup>	217 15	25 55	0.4367
11	15 55 <sup>h</sup> 2 <sup>m</sup>	19 29	0.2968	14 35 <sup>h</sup> 6 <sup>m</sup>	219 25	26 45	0.4406
21	15 49 <sup>h</sup> 8 <sup>m</sup>	21 54	0.2944	13 50 <sup>h</sup> 8 <sup>m</sup>	221 34	27 33	0.4445
May 1	15 42 <sup>h</sup> 6 <sup>m</sup>	23 54	0.2967	13 4 <sup>h</sup> 2 <sup>m</sup>	223 43	28 18	0.4483
11	15 34 <sup>h</sup> 3 <sup>m</sup>	25 21	0.3037	12 16 <sup>h</sup> 7 <sup>m</sup>	225 51	29 0	0.4521
21	15 25 <sup>h</sup> 9 <sup>m</sup>	26 11	0.3149	11 29 <sup>h</sup> 0 <sup>m</sup>	227 59	29 39	0.4557
31	15 18 <sup>h</sup> 3 <sup>m</sup>	26 25	0.3296	10 42 <sup>h</sup> 2 <sup>m</sup>	230 6	30 16	0.4593
June 10	15 12 <sup>h</sup> 1 <sup>m</sup>	26 6	0.3470	9 56 <sup>h</sup> 8 <sup>m</sup>	232 13	30 50	0.4628
20	15 7 <sup>h</sup> 9 <sup>m</sup>	25 19	0.3662	9 13 <sup>h</sup> 3 <sup>m</sup>	234 19	31 21	0.4662
30	15 5 <sup>h</sup> 8 <sup>m</sup>	24 10	0.3864	8 32 <sup>h</sup> 0 <sup>m</sup>	236 24	31 50	0.4696
July 10	15 5 <sup>h</sup> 9 <sup>m</sup>	22 47	0.4072	7 52 <sup>h</sup> 8 <sup>m</sup>	238 29	32 17	0.4728
20	15 8 <sup>h</sup> 0 <sup>m</sup>	21 12	0.4280	7 15 <sup>h</sup> 7 <sup>m</sup>	240 33	32 41	0.4760
30	15 12 <sup>h</sup> 0 <sup>m</sup>	19 32	0.4483	6 40 <sup>h</sup> 4 <sup>m</sup>	242 37	33 3	0.4791
Aug. 9	15 17 <sup>h</sup> 7 <sup>m</sup>	17 48	0.4679	6 6 <sup>h</sup> 9 <sup>m</sup>	244 39	33 22	0.4821
19	15 24 <sup>h</sup> 9 <sup>m</sup>	16 5	0.4866	5 34 <sup>h</sup> 7 <sup>m</sup>	246 41	33 39	0.4851
29	15 33 <sup>h</sup> 4 <sup>m</sup>	14 23	0.5043	5 3 <sup>h</sup> 9 <sup>m</sup>	248 42	33 54	0.4879
Sept. 8	15 43 <sup>h</sup> 1 <sup>m</sup>	12 44	0.5209	4 34 <sup>h</sup> 2 <sup>m</sup>	250 42	34 7	0.4906
18	15 53 <sup>h</sup> 7 <sup>m</sup>	11 11	0.5362	4 5 <sup>h</sup> 5 <sup>m</sup>	252 42	34 18	0.4933
28	16 5 <sup>h</sup> 1 <sup>m</sup>	9 44	0.5503	3 37 <sup>h</sup> 6 <sup>m</sup>	254 40	34 27	0.4959
Oct. 8	16 17 <sup>h</sup> 4 <sup>m</sup>	8 24	0.5630	3 10 <sup>h</sup> 4 <sup>m</sup>	256 37	34 34	0.4984
18	16 30 <sup>h</sup> 2 <sup>m</sup>	7 12	0.5744	2 43 <sup>h</sup> 9 <sup>m</sup>	258 33	34 39	0.5008
28	16 43 <sup>h</sup> 5 <sup>m</sup>	6 8	0.5845	2 17 <sup>h</sup> 8 <sup>m</sup>	260 28	34 42	0.5031
Nov. 7	16 57 <sup>h</sup> 3 <sup>m</sup>	5 14	0.5931	1 52 <sup>h</sup> 2 <sup>m</sup>	262 22	34 43	0.5054
17	17 11 <sup>h</sup> 4 <sup>m</sup>	4 30	0.6004	1 26 <sup>h</sup> 9 <sup>m</sup>	264 15	34 42	0.5075
27	17 25 <sup>h</sup> 7 <sup>m</sup>	3 55	0.6063	1 1 <sup>h</sup> 9 <sup>m</sup>	266 7	34 40	0.5096
Dec. 7	17 40 <sup>h</sup> 2 <sup>m</sup>	3 31	0.6107	0 37 <sup>h</sup> 0 <sup>m</sup>	267 57	34 36	0.5116
17	17 54 <sup>h</sup> 7 <sup>m</sup>	3 17	0.6137	0 12 <sup>h</sup> 1 <sup>m</sup>	269 46	34 31	0.5135
27	18 9 <sup>h</sup> 2 <sup>m</sup>	3 14	0.6153	23 44 <sup>h</sup> 7 <sup>m</sup>	271 34	34 24	0.5154
37	18 23 <sup>h</sup> 5 <sup>m</sup>	N. 3 21	0.6154	23 19 <sup>h</sup> 7 <sup>m</sup>	273 21	N. 34 15	0.5171



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
			—	North.	North.	+	
Apr. 6	h m s 15 56 47.55	h m s 15 56 27.64	0.80	18 19 26.8	18 35 26.4	40.1	4.5
8	15 56 6.24	15 55 43.38	0.92	18 51 18.4	19 7 2.2	39.5	4.5
10	15 55 19.08	15 54 53.36	1.04	19 22 37.2	19 38 2.8	38.8	4.5
12	15 54 26.24	15 53 57.76	1.16	19 53 18.3	20 8 23.3	37.9	4.5
14	15 53 27.94	15 52 56.81	1.27	20 23 17.1	20 37 59.2	37.0	4.5
16	15 52 24.39	15 51 50.72	1.38	20 52 28.9	21 6 45.8	36.0	4.5
18	15 51 15.83	15 50 39.74	1.48	21 20 49.2	21 34 38.8	34.9	4.6
20	15 50 2.51	15 49 24.15	1.57	21 48 13.8	22 1 33.9	33.7	4.6
22	15 48 44.72	15 48 4.26	1.66	22 14 38.4	22 27 26.8	32.4	4.6
24	15 47 22.80	15 46 40.38	1.75	22 39 58.8	22 52 13.7	31.0	4.6
26	15 45 57.04	15 45 12.85	1.82	23 4 11.0	23 15 50.3	29.5	4.5
28	15 44 27.83	15 43 42.05	1.89	23 27 11.2	23 38 13.3	28.0	4.5
30	15 42 55.55	15 42 8.38	1.95	23 48 56.1	23 59 19.2	26.4	4.5
May 2	15 41 20.60	15 40 32.27	2.00	24 9 22.2	24 19 5.0	24.7	4.5
4	15 39 43.44	15 38 54.17	2.04	24 28 27.0	24 37 28.1	23.0	4.5
6	15 38 4.52	15 37 14.55	2.08	24 46 8.1	24 54 26.5	21.2	4.5
8	15 36 24.32	15 35 33.88	2.10	25 2 23.2	25 9 58.2	19.4	4.5
10	15 34 43.28	15 33 52.59	2.11	25 17 11.3	25 24 2.4	17.6	4.5
12	15 33 1.85	15 32 11.14	2.11	25 30 31.4	25 36 38.2	15.7	4.4
14	15 31 20.50	15 30 29.98	2.11	25 42 22.8	25 47 45.3	13.9	4.4
16	15 29 39.64	15 28 49.51	2.09	25 52 45.6	25 57 23.7	12.1	4.4
18	15 27 59.67	15 27 10.16	2.07	26 1 39.7	26 5 33.8	10.2	4.4
20	15 26 21.02	15 25 32.30	2.04	26 9 5.9	26 12 16.1	8.4	4.4
22	15 24 44.06	15 23 56.34	2.00	26 15 4.6	26 17 31.5	6.6	4.3
24	15 23 9.18	15 22 22.62	1.95	26 19 36.9	26 21 21.0	4.8	4.3
26	15 21 36.72	15 20 51.52	1.90	26 22 43.9	26 23 45.9	3.0	4.3
28	15 20 7.06	15 19 23.38	1.84	26 24 27.1	26 24 47.9	1.3	4.3
30	15 18 40.53	15 17 58.55	1.77	26 24 48.3	26 24 28.8	0.4	4.2
June 1	15 17 17.47	15 16 37.32	1.69	26 23 49.6	26 22 50.9	2.0	4.2
3	15 15 58.15	15 15 19.98	1.61	26 21 33.1	26 19 56.6	3.6	4.2
5	15 14 42.84	15 14 6.77	1.52	26 18 1.5	26 15 48.2	5.2	4.1
7	15 13 31.80	15 12 57.94	1.43	26 13 17.1	26 10 28.6	6.7	4.1
9	15 12 25.22	15 11 53.66	1.34	26 7 23.1	26 4 1.0	8.1	4.1
11	15 11 23.28	15 10 54.10	1.24	26 0 22.5	25 56 28.3	9.4	4.0
13	15 10 26.13	15 9 59.38	1.14	25 52 18.6	25 47 53.7	10.7	4.0
15	15 9 33.87	15 9 9.61	1.04	25 43 14.0	25 38 20.0	12.0	3.9
17	15 8 46.60	15 8 24.85	0.93	25 33 11.8	25 27 50.1	13.1	3.9
19	15 8 4.37	15 7 45.18	0.83	25 22 15.0	25 16 26.9	14.2	3.8
21	15 7 27.27	15 7 10.65	0.72	25 10 26.2	25 4 13.3	15.3	3.8
23	15 6 55.32	15 6 41.28	0.61	24 57 48.4	24 51 11.9	16.3	3.7
25	15 6 28.54	15 6 17.11	0.50	24 44 24.2	24 37 25.6	17.2	3.7
27	15 6 6.98	15 5 58.16	0.39	24 30 16.4	24 22 56.9	18.1	3.7



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declination in 1 Hour of Long.	Hor. Par.
	h m s	h m s	s	North.	North.	"	"
June 29	15 5 50.65	15 5 44.44	0.29	24 15 27.6	24 15 27.6	18.9	3.7
July 1	15 5 39.54	15 5 35.94	0.18	24 0 0.3	24 7 48.5	19.7	3.6
3	15 5 33.63	15 5 32.62	0.07	23 43 57.4	23 52 3.1	20.4	3.6
			+		23 35 43.5		
5	15 5 32.90	15 5 34.47	0.04	23 27 21.7	23 18 52.3	21.1	3.5
7	15 5 37.31	15 5 41.41	0.14	23 10 15.6	23 1 31.9	21.7	3.5
9	15 5 46.77	15 5 53.37	0.25	22 52 41.6	22 43 45.0	22.2	3.5
11	15 6 1.19	15 6 10.23	0.35	22 34 42.2	22 25 33.7	22.7	3.5
13	15 6 20.49	15 6 31.94	0.45	22 16 19.7	22 7 0.4	23.2	3.5
15	15 6 44.57	15 6 58.37	0.55	21 57 36.0	21 48 6.9	23.6	3.4
17	15 7 13.34	15 7 29.46	0.65	21 38 33.2	21 28 55.3	24.0	3.4
19	15 7 46.71	15 8 5.09	0.74	21 19 13.3	21 9 27.5	24.3	3.4
21	15 8 24.59	15 8 45.20	0.84	20 59 37.9	20 49 44.9	24.6	3.3
23	15 9 6.90	15 9 29.69	0.93	20 39 48.6	20 29 49.2	24.9	3.3
25	15 9 53.55	15 10 18.47	1.02	20 19 47.0	20 9 42.1	25.1	3.2
27	15 10 44.45	15 11 11.47	1.10	19 59 34.8	19 49 25.2	25.3	3.2
29	15 11 39.52	15 12 8.60	1.19	19 39 13.5	19 28 59.9	25.5	3.2
31	15 12 38.70	15 13 9.80	1.28	19 18 44.7	19 8 27.9	25.7	3.1
Aug. 2	15 13 41.88	15 14 14.93	1.36	18 58 9.8	18 47 50.6	25.8	3.1
4	15 14 48.95	15 15 23.91	1.44	18 37 30.4	18 27 9.4	25.9	3.1
6	15 15 59.81	15 16 36.63	1.52	18 16 47.8	18 6 25.7	25.9	3.1
8	15 17 14.37	15 17 53.00	1.59	17 56 3.3	17 45 40.7	25.9	3.0
10	15 18 32.51	15 19 12.90	1.66	17 35 18.1	17 24 55.8	25.9	3.0



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 18 <sup>m</sup> 16.4	N. 3 16'	0.6155	<sup>h</sup> 23 <sup>m</sup> 32.2	<sup>o</sup> 272 28	N. 34 20'	0.5163
11	18 30.6	3 28	0.6149	23 7.0	274 14	34 11	0.5180
21	18 44.5	3 51	0.6128	22 41.5	275 59	34 0	0.5196
31	18 58.1	4 22	0.6093	22 15.7	277 43	33 48	0.5211
Feb. 10	19 11.1	5 3	0.6043	21 49.3	279 26	33 34	0.5226
20	19 23.6	5 51	0.5979	21 22.3	281 7	33 20	0.5240
Mar. 1	19 35.3	6 48	0.5900	20 54.6	282 47	33 4	0.5253
11	19 46.3	7 51	0.5807	20 26.1	284 26	32 47	0.5265
21	19 56.3	8 59	0.5701	19 56.7	286 4	32 28	0.5277
31	20 5.3	10 12	0.5582	19 26.2	287 40	32 9	0.5287
Apr. 10	20 13.1	11 29	0.5451	18 54.6	289 16	31 48	0.5297
20	20 19.6	12 46	0.5309	18 21.6	290 50	31 26	0.5306
30	20 24.6	14 4	0.5159	17 47.2	292 23	31 3	0.5315
May 10	20 28.0	15 19	0.5002	17 11.1	293 55	30 40	0.5322
20	20 29.6	16 29	0.4843	16 33.3	295 26	30 15	0.5329
30	20 29.4	17 30	0.4684	15 53.6	296 56	29 49	0.5335
June 9	20 27.2	18 19	0.4532	15 12.0	298 25	29 23	0.5340
19	20 23.1	18 52	0.4392	14 28.5	299 53	28 55	0.5345
29	20 17.4	19 4	0.4272	13 43.4	301 20	28 26	0.5348
July 9	20 10.4	18 52	0.4178	12 57.0	302 46	27 57	0.5351
19	20 2.5	18 15	0.4118	12 9.9	304 11	27 27	0.5354
29	19 54.5	17 13	0.4097	11 22.6	305 35	26 56	0.5355
Aug. 8	19 47.1	15 48	0.4115	10 36.0	306 59	26 24	0.5355
18	19 40.8	14 4	0.4175	9 50.5	308 22	25 52	0.5355
28	19 36.2	12 9	0.4271	9 6.6	309 44	25 18	0.5355
Sept. 7	19 33.4	10 9	0.4398	8 24.6	311 5	24 44	0.5353
17	19 32.7	8 8	0.4548	7 44.6	312 25	24 9	0.5350
27	19 34.0	6 13	0.4715	7 6.7	313 45	23 33	0.5347
Oct. 7	19 37.2	4 27	0.4891	6 30.6	315 5	22 57	0.5343
17	19 42.1	2 51	0.5069	5 56.2	316 23	22 20	0.5339
27	19 48.6	1 28	0.5245	5 23.4	317 42	21 42	0.5333
Nov. 6	19 56.5	N. 0 17'	0.5414	4 52.0	319 0	21 4	0.5327
16	20 5.6	S. 0 41'	0.5574	4 21.7	320 17	20 24	0.5320
26	20 15.6	1 26	0.5721	3 52.4	321 34	19 44	0.5312
Dec. 6	20 26.5	1 59	0.5855	3 23.9	322 50	19 4	0.5304
16	20 38.0	2 20	0.5973	2 56.0	324 7	18 22	0.5295
26	20 50.0	2 30	0.6075	2 28.7	325 23	17 40	0.5284
36	21 2.5	S. 2 31'	0.6160	2 1.8	326 39	N. 16 57'	0.5273



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	North.	North.	+	"
June 11	20 26 17.33	20 25 55.14	0.90	18 29 16.4	18 32 53.2	9.3	3.1
13	20 25 31.86	20 25 7.48	0.99	18 36 19.3	18 39 34.6	8.4	3.2
15	20 24 42.02	20 24 15.49	1.08	18 42 38.8	18 45 31.7	7.4	3.2
17	20 23 47.90	20 23 19.27	1.17	18 48 13.0	18 50 42.5	6.5	3.2
19	20 22 49.61	20 22 18.95	1.26	18 52 59.9	18 55 4.9	5.5	3.2
21	20 21 47.30	20 21 14.69	1.34	18 56 57.3	18 58 36.9	4.4	3.2
23	20 20 41.13	20 20 6.66	1.42	19 0 3.4	19 1 16.5	3.3	3.3
25	20 19 31.29	20 18 55.05	1.49	19 2 16.1	19 3 2.0	2.2	3.3
27	20 18 17.96	20 17 40.04	1.56	19 3 34.2	19 3 52.3	1.0	3.3
29	20 17 1.33	20 16 21.85	1.63	19 3 56.3	19 3 46.0	—	3.3
July 1	20 15 41.63	20 15 0.69	1.69	19 3 21.3	19 2 42.1	0.1	3.3
3	20 14 19.07	20 13 36.79	1.75	19 1 48.1	19 0 39.3	1.3	3.3
5	20 12 53.88	20 12 10.39	1.80	18 59 15.6	18 57 36.8	2.6	3.3
7	20 11 26.33	20 10 41.74	1.85	18 55 42.9	18 53 33.8	3.8	3.4
9	20 9 56.66	20 9 11.11	1.89	18 51 9.4	18 48 29.6	5.1	3.4
11	20 8 25.14	20 7 38.78	1.92	18 45 34.4	18 42 23.7	6.3	3.4
13	20 6 52.07	20 6 5.04	1.95	18 38 57.5	18 35 15.8	7.6	3.4
15	20 5 17.74	20 4 30.21	1.98	18 31 18.5	18 27 5.7	8.9	3.5
17	20 3 42.48	20 2 54.60	1.99	18 22 37.3	18 17 53.5	10.2	3.5
19	20 2 6.61	20 1 18.55	2.00	18 12 54.3	18 7 39.8	11.5	3.5
21	20 0 30.48	19 59 42.42	2.00	18 2 10.1	17 56 25.3	12.8	3.5
23	19 58 54.43	19 58 6.55	2.00	17 50 25.6	17 44 11.1	14.1	3.5
25	19 57 18.82	19 56 31.28	1.99	17 37 42.1	17 30 58.7	15.3	3.5
27	19 55 43.97	19 54 56.93	1.97	17 24 1.1	17 16 49.5	16.5	3.5
29	19 54 10.21	19 53 23.83	1.94	17 9 24.2	17 1 45.3	17.7	3.5
31	19 52 37.83	19 51 52.26	1.91	16 53 53.2	16 45 48.1	18.8	3.5
Aug. 2	19 51 7.14	19 50 22.52	1.87	16 37 30.2	16 28 59.8	19.9	3.5
4	19 49 38.44	19 48 54.91	1.83	16 20 17.2	16 11 22.8	21.0	3.5
6	19 48 11.99	19 47 29.70	1.78	16 2 16.8	15 52 59.6	22.0	3.5
8	19 46 48.08	19 46 7.16	1.72	15 43 31.3	15 33 52.5	23.0	3.5
10	19 45 26.96	19 44 47.52	1.66	15 24 3.3	15 14 4.1	23.9	3.5
12	19 44 8.87	19 43 31.04	1.59	15 3 55.3	14 53 37.2	24.8	3.5
14	19 42 54.07	19 42 17.99	1.52	14 43 10.1	14 32 34.6	25.6	3.5
16	19 41 42.81	19 41 8.58	1.45	14 21 50.8	14 10 59.2	26.3	3.5
18	19 40 35.31	19 40 3.03	1.37	14 0 0.2	13 48 54.2	27.0	3.5
20	19 39 31.76	19 39 1.52	1.28	13 37 41.6	13 26 22.8	27.6	3.5
22	19 38 32.33	19 38 4.22	1.19	13 14 58.3	13 3 28.4	28.2	3.5
24	19 37 37.20	19 37 11.28	1.10	12 51 53.5	12 40 14.0	28.6	3.5
26	19 36 46.48	19 36 22.81	1.01	12 28 30.4	12 16 43.0	29.0	3.4
28	19 36 0.28	19 35 38.90	0.91	12 4 52.1	11 52 58.2	29.4	3.4
30	19 35 18.69	19 34 59.65	0.82	11 41 1.6	11 29 2.7	29.7	3.4
Sept. 1	19 34 41.79	19 34 25.11	0.72	11 17 1.9	11 4 59.4	29.9	3.4



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	North.	North.	—	—
Sept. 3	19 34 9.62	19 33 55.32	0.62	10 52 55.6	10 40 50.9	30.2	3.3
5	19 33 42.22	19 33 30.33	0.52	10 28 45.6	10 16 40.0	30.2	3.3
7	19 33 19.65	19 33 10.18	0.42	10 4 34.4	9 52 29.1	30.2	3.3
9	19 33 1.93	19 32 54.90	0.32	9 40 24.5	9 28 20.7	30.2	3.2
11	19 32 49.09	19 32 44.51	0.22	9 16 18.2	9 4 17.3	30.1	3.2
13	19 32 41.15	19 32 39.01	0.11	8 52 18.1	8 40 21.1	29.9	3.1
15	19 32 38.10	19 32 38.42	0.01	8 28 26.5	8 16 34.5	29.7	3.1
			+				
17	19 32 39.95	19 32 42.70	0.09	8 4 45.4	7 52 59.5	29.5	3.1
19	19 32 46.66	19 32 51.82	0.19	7 41 17.0	7 29 38.1	29.2	3.1
21	19 32 58.18	19 33 5.73	0.29	7 18 3.2	7 6 32.3	28.9	3.1
23	19 33 14.47	19 33 24.38	0.39	6 55 5.8	6 43 43.8	28.5	3.0
25	19 33 35.46	19 33 47.70	0.49	6 32 26.5	6 21 14.1	28.1	3.0
27	19 34 1.09	19 34 15.62	0.58	6 10 6.8	5 59 4.8	27.7	3.0
29	19 34 31.27	19 34 48.04	0.68	5 48 8.3	5 37 17.3	27.2	3.0
Oct. 1	19 35 5.93	19 35 24.92	0.77	5 26 31.9	5 15 52.4	26.8	2.9
3	19 35 44.99	19 36 6.13	0.86	5 5 18.9	4 54 51.4	26.3	2.9
5	19 36 28.35	19 36 51.63	0.95	4 44 30.0	4 34 14.9	25.8	2.9
7	19 37 15.95	19 37 41.32	1.03	4 24 6.3	4 14 4.2	25.2	2.9
9	19 38 7.72	19 38 35.13	1.12	4 4 8.8	3 54 20.1	24.7	2.9
11	19 39 3.56	19 39 32.99	1.21	3 44 38.2	3 35 3.2	24.1	2.8
13	19 40 3.41	19 40 34.82	1.29	3 25 35.2	3 16 14.3	23.5	2.8
15	19 41 7.20	19 41 40.54	1.37	3 7 0.5	2 57 53.9	22.9	2.8



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	<sup>h m</sup> 20 57.5	<sup>° ' "</sup> S. 2 32	0.6128	<sup>h m</sup> 2 12.5	<sup>° ' "</sup> 326 8	<sup>° ' "</sup> N. 17 15	0.5278
11	21 10.1	2 27	0.6203	1 45.8	327 24	16 32	0.5266
21	21 23.0	2 14	0.6260	1 19.3	328 39	15 48	0.5254
31	21 36.0	1 53	0.6299	0 53.0	329 55	15 3	0.5241
Feb. 10	21 49.2	1 26	0.6321	0 26.7	331 10	14 18	0.5228
20	22 2.3	0 54	0.6324	{ 25 28.3 }	332 25	13 32	0.5213
Mar. 2	22 15.3	S. 0 17	0.6309	23 31.5	333 41	12 45	0.5198
12	22 28.3	N. 0 23	0.6276	23 5.0	334 56	11 58	0.5181
22	22 41.1	1 5	0.6224	22 38.4	336 12	11 10	0.5164
Apr. 1	22 53.6	1 48	0.6154	22 11.6	337 28	10 21	0.5147
11	23 5.9	2 32	0.6065	21 44.5	338 44	9 32	0.5128
21	23 17.8	3 14	0.5958	21 17.0	340 0	8 42	0.5109
May 1	23 29.4	3 53	0.5832	20 49.2	341 17	7 51	0.5088
11	23 40.5	4 30	0.5688	20 20.9	342 34	7 0	0.5067
21	23 51.1	5 0	0.5524	19 52.0	343 51	6 7	0.5045
31	0 1.0	5 25	0.5342	19 22.5	345 9	5 14	0.5022
June 10	0 10.2	5 41	0.5143	18 52.3	346 28	4 21	0.4999
20	0 18.5	5 47	0.4925	18 21.1	347 48	3 26	0.4974
30	0 25.7	5 41	0.4692	17 48.9	349 8	2 31	0.4949
July 10	0 31.6	5 20	0.4446	17 15.3	350 29	1 35	0.4923
20	0 36.1	4 42	0.4190	16 40.3	351 51	N. 0 38	0.4896
30	0 38.8	3 45	0.3930	16 3.7	353 14	S. 0 19	0.4868
Aug. 9	0 39.7	2 26	0.3675	15 25.1	354 38	1 18	0.4839
19	0 38.5	N. 0 46	0.3434	14 44.5	356 3	2 16	0.4810
29	0 35.3	S. 1 17	0.3223	14 1.9	357 30	3 16	0.4780
Sept. 8	0 30.2	3 37	0.3055	13 17.3	358 58	4 16	0.4748
18	0 23.6	6 8	0.2945	12 31.4	0 27	5 18	0.4716
28	0 16.0	8 41	0.2901	11 44.5	1 58	6 19	0.4683
Oct. 8	0 8.4	11 4	0.2928	10 57.7	3 31	7 22	0.4650
18	0 1.6	13 9	0.3017	10 11.6	5 6	8 25	0.4615
28	23 56.3	14 49	0.3158	9 27.1	6 43	9 29	0.4580
Nov. 7	23 53.0	16 2	0.3336	8 44.6	8 22	10 33	0.4544
17	23 52.0	16 49	0.3535	8 4.4	10 4	11 38	0.4507
27	23 53.4	17 12	0.3743	7 26.6	11 48	12 43	0.4469
Dec. 7	23 57.0	17 14	0.3950	6 50.9	13 34	13 49	0.4431
17	0 2.7	16 59	0.4150	6 17.2	15 24	14 56	0.4392
27	0 10.2	16 29	0.4336	5 45.5	17 18	16 2	0.4352
37	0 19.4	S. 15 47	0.4507	5 15.3	19 14	S. 17 9	0.4312



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	s	North. ° ' "	North. ° ' "	— " "	" "
Aug. 15	0 39 9.34	0 38 59.78	0.37	1 22 14.2	0 11 42.3	26.1	4.0
17	0 38 49.00	0 38 36.98	0.48	1 0 57.2	0 49 59.1	27.2	4.0
19	0 38 23.73	0 38 9.25	0.58	0 38 48.1	0 27 24.2	28.2	4.1
21	0 37 53.55	0 37 36.62	0.68	0 15 47.6	0 3 58.4	29.3	4.1
				South.	South.		
23	0 37 18.47	0 36 59.12	0.78	0 8 3.1	0 20 16.8	30.3	4.2
25	0 36 38.56	0 36 16.81	0.88	0 32 42.4	0 45 19.8	31.3	4.2
27	0 35 53.87	0 35 29.75	0.98	0 58 8.8	1 11 9.1	32.3	4.3
29	0 35 4.48	0 34 38.06	1.08	1 24 20.3	1 37 42.3	33.2	4.3
31	0 34 10.50	0 33 41.83	1.17	1 51 14.6	2 4 57.0	34.1	4.3
Sept. 2	0 33 12.07	0 32 41.24	1.26	2 18 49.0	2 32 50.3	34.9	4.3
4	0 32 9.36	0 31 36.46	1.35	2 47 0.5	3 1 18.9	35.6	4.4
6	0 31 2.57	0 30 27.71	1.43	3 15 45.3	3 30 19.0	36.3	4.4
8	0 29 51.93	0 29 15.24	1.51	3 44 59.7	3 59 46.8	36.8	4.4
10	0 28 37.70	0 27 59.34	1.58	4 14 39.9	4 29 38.1	37.3	4.5
12	0 27 20.19	0 26 40.29	1.65	4 44 41.1	4 59 48.2	37.7	4.5
14	0 25 59.67	0 25 18.39	1.71	5 14 59.0	5 30 12.7	38.0	4.5
16	0 24 36.47	0 23 53.96	1.76	5 45 28.8	6 0 46.6	38.2	4.5
18	0 23 10.90	0 22 27.34	1.80	6 16 5.5	6 31 25.0	38.3	4.5
20	0 21 43.32	0 20 58.89	1.84	6 46 44.3	7 2 2.9	38.3	4.6
22	0 20 14.08	0 19 28.94	1.87	7 17 20.2	7 32 35.4	38.2	4.6
♂ 24	0 18 43.52	0 17 57.87	1.90	7 47 48.0	8 2 57.3	38.0	4.6
26	0 17 12.04	0 16 26.07	1.91	8 18 2.6	8 33 3.4	37.6	4.6
28	0 15 40.02	0 14 53.92	1.92	8 47 58.9	9 2 48.7	37.2	4.6
30	0 14 7.85	0 13 21.85	1.92	9 17 31.9	9 32 8.1	36.7	4.6
Oct. 2	0 12 35.99	0 11 50.30	1.91	9 46 36.6	10 0 56.9	36.0	4.6
4	0 11 4.85	0 10 19.69	1.89	10 15 8.3	10 29 10.2	35.3	4.6
6	0 9 34.87	0 8 50.45	1.86	10 43 2.1	10 56 43.6	34.4	4.6
8	0 8 6.48	0 7 23.00	1.82	11 10 14.0	11 23 32.9	33.5	4.6
10	0 6 40.07	0 5 57.74	1.78	11 36 40.0	11 49 34.6	32.5	4.5
12	0 5 16.06	0 4 35.06	1.72	12 2 16.4	12 14 45.1	31.5	4.5
14	0 3 54.79	0 3 15.30	1.66	12 27 0.2	12 39 1.6	30.4	4.5
16	0 2 36.62	0 1 58.79	1.59	12 50 48.8	13 2 21.5	29.2	4.5
18	0 1 21.86	0 0 45.85	1.52	13 13 39.5	13 24 42.6	28.0	4.5
20	0 0 10.80	23 59 36.75	1.44	13 35 30.6	13 46 3.2	26.7	4.4
22	23 59 3.72	23 58 31.75	1.35	13 56 20.3	14 6 21.8	25.4	4.4
24	23 58 0.87	23 57 31.10	1.26	14 16 7.5	14 25 37.2	24.1	4.4
26	23 57 2.49	23 56 35.04	1.17	14 34 50.9	14 43 48.5	22.7	4.3
28	23 56 8.79	23 55 43.76	1.07	14 52 29.8	15 0 54.9	21.4	4.3
30	23 55 19.98	23 54 57.47	0.96	15 9 3.7	15 16 56.2	20.0	4.3
Nov. 1	23 54 36.26	23 54 16.36	0.86	15 24 32.5	15 31 52.4	18.7	4.3
3	23 53 57.79	23 53 40.57	0.75	15 38 56.2	15 45 43.7	17.3	4.2
5	23 53 24.71	23 53 10.23	0.63	15 52 15.1	15 58 30.5	16.0	4.2



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	—	
Nov. 7	23 52 57.13	23 52 45.42	0.52	16 4 29.9	16 10 13.3	14.6	4.1
9	23 52 35.12	23 52 26.22	0.40	16 15 41.0	16 20 53.0	13.3	4.1
11	23 52 18.72	23 52 12.64	0.28	16 25 49.6	16 30 30.9	12.0	4.1
13	23 52 7.98	23 52 4.72	0.16	16 34 57.1	16 39 8.3	10.8	4.0
15	23 52 2.88	23 52 2.45	0.05	16 43 4.9	16 46 47.1	9.6	4.0
			+				
17	23 52 3.43	23 52 5.81	0.07	16 50 14.9	16 53 28.5	8.4	4.0
19	23 52 9.58	23 52 14.75	0.18	16 56 28.1	16 59 13.8	7.2	3.9
21	23 52 21.31	23 52 29.25	0.30	17 1 45.8	17 4 4.3	6.1	3.9
23	23 52 38.55	23 52 49.23	0.42	17 6 9.4	17 8 1.4	5.0	3.9
25	23 53 1.27	23 53 14.67	0.53	17 9 40.5	17 11 6.8	3.9	3.8
27	23 53 29.41	23 53 45.50	0.64	17 12 20.6	17 13 22.0	2.8	3.8
29	23 54 2.92	23 54 21.67	0.75	17 14 11.3	17 14 48.6	1.8	3.8
Dec. 1	23 54 41.74	23 55 3.12	0.86	17 15 14.1	17 15 28.0	0.8	3.7
						+	
3	23 55 25.80	23 55 49.77	0.97	17 15 30.5	17 15 21.8	0.1	3.7
5	23 56 15.02	23 56 41.52	1.08	17 15 2.0	17 14 31.5	1.0	3.7
7	23 57 9.28	23 57 38.27	1.18	17 13 50.5	17 12 59.0	1.9	3.6
9	23 58 8.48	23 58 39.90	1.28	17 11 57.3	17 10 45.7	2.7	3.6
11	23 59 12.51	23 59 46.29	1.38	17 9 24.4	17 7 53.4	3.6	3.5
13	0 0 21.24	0 0 57.34	1.48	17 6 13.1	17 4 23.5	4.4	3.5
15	0 1 34.57	0 2 12.92	1.57	17 2 25.0	17 0 17.6	5.1	3.5
17	0 2 52.37	0 3 32.92	1.67	16 58 1.6	16 55 37.1	5.8	3.4
19	0 4 14.54	0 4 57.22	1.76	16 53 4.3	16 50 23.3	6.5	3.4
21	0 5 40.95	0 6 25.71	1.84	16 47 34.3	16 44 37.4	7.2	3.4



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 0 <sup>m</sup> 14.6	S. 16 9	0.4424	<sup>h</sup> 5 <sup>m</sup> 30.2	<sup>o</sup> 18 15	S. 16 36	0.4332
11	0 24.5	15 23	0.4586	5 0.7	20 13	17 42	0.4291
21	0 35.6	14 28	0.4730	4 32.5	22 15	18 49	0.4250
31	0 47.9	13 27	0.4855	4 5.5	24 21	19 56	0.4208
Feb. 10	1 1.2	12 21	0.4962	3 39.4	26 31	21 3	0.4166
20	1 15.5	11 13	0.5050	3 14.3	28 46	22 9	0.4124
Mar. 2	1 30.5	10 2	0.5121	2 49.9	31 6	23 14	0.4081
12	1 46.2	8 51	0.5174	2 26.2	33 31	24 19	0.4038
22	2 2.6	7 42	0.5211	2 3.3	36 1	25 23	0.3994
Apr. 1	2 19.7	6 34	0.5233	1 40.9	38 37	26 25	0.3951
11	2 37.3	5 30	0.5240	1 19.2	41 19	27 26	0.3907
21	2 55.5	4 30	0.5234	0 58.0	44 7	28 24	0.3864
May 1	3 14.2	3 36	0.5215	0 37.3	47 1	29 20	0.3821
11	3 33.5	2 49	0.5185	10 17.2	50 3	30 13	0.3778
21	3 53.2	2 10	0.5144	23 55.5	53 11	31 3	0.3736
31	4 13.3	1 40	0.5093	23 36.2	56 26	31 49	0.3694
June 10	4 33.7	1 19	0.5033	23 17.3	59 48	32 31	0.3653
20	4 54.5	1 9	0.4965	22 58.7	63 17	33 8	0.3613
30	5 15.5	1 11	0.4890	22 40.3	66 53	33 39	0.3574
July 10	5 36.6	1 24	0.4807	22 22.1	70 35	34 5	0.3537
20	5 57.8	1 49	0.4718	22 3.9	74 22	34 24	0.3500
30	6 19.0	2 25	0.4623	21 45.6	78 15	34 36	0.3466
Aug. 9	6 40.0	3 13	0.4522	21 27.2	82 12	34 41	0.3433
19	7 0.8	4 12	0.4414	21 8.6	86 13	34 38	0.3402
29	7 21.3	5 21	0.4299	20 49.6	90 17	34 27	0.3374
Sept. 8	7 41.3	6 39	0.4177	20 30.2	94 22	34 8	0.3348
18	8 0.8	8 5	0.4046	20 10.3	98 27	33 41	0.3324
28	8 19.6	9 36	0.3905	19 49.7	102 32	33 4	0.3303
Oct. 8	8 37.7	11 13	0.3754	19 28.3	106 36	32 20	0.3284
18	8 54.9	12 51	0.3591	19 6.0	110 37	31 28	0.3269
28	9 11.1	14 31	0.3414	18 42.7	114 35	30 27	0.3257
Nov. 7	9 26.1	16 7	0.3223	18 18.3	118 29	29 20	0.3247
17	9 39.8	17 39	0.3015	17 52.5	122 19	28 5	0.3241
27	9 51.9	19 2	0.2790	17 25.0	126 3	26 44	0.3239
Dec. 7	10 2.1	20 13	0.2548	16 55.7	129 42	25 17	0.3239
17	10 10.1	21 7	0.2290	16 24.3	133 16	23 45	0.3243
27	10 15.7	21 37	0.2019	15 50.3	136 43	22 9	0.3250
37	10 18.5	S. 21 36	0.1742	15 13.6	140 6	S. 20 29	0.3260



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 11 20.3	S. 2 1	0.3122	h m 16 35.1	° ' / 150 11	S. 4 40	0.4059
11	11 22.5	1 55	0.2911	15 57.8	152 31	4 10	0.4107
21	11 22.1	1 28	0.2714	15 18.0	154 47	3 40	0.4153
31	11 19.2	S. 0 38	0.2544	14 35.6	157 1	3 10	0.4199
Feb. 10	11 13.9	N. 0 32	0.2419	13 50.9	159 11	2 41	0.4244
20	11 6.8	1 59	0.2353	13 4.4	161 19	2 12	0.4288
Mar. 2	10 58.8	3 36	0.2358	12 17.1	163 24	1 43	0.4331
12	10 50.7	5 15	0.2436	11 29.8	165 27	1 15	0.4373
22	10 43.7	6 47	0.2582	10 43.5	167 27	0 47	0.4415
Apr. 1	10 38.3	8 5	0.2784	9 59.0	169 25	S. 0 20	0.4455
11	10 35.1	9 6	0.3026	9 16.5	171 21	N. 0 7	0.4494
21	10 34.2	9 49	0.3292	8 36.4	173 15	0 33	0.4533
May 1	10 35.5	10 13	0.3569	7 58.5	175 7	0 59	0.4570
11	10 38.9	10 21	0.3847	7 22.7	176 57	1 25	0.4606
21	10 44.2	10 15	0.4118	6 48.6	178 45	1 49	0.4641
31	10 50.9	9 55	0.4378	6 16.0	180 32	2 14	0.4675
June 10	10 58.9	9 25	0.4623	5 44.7	182 17	2 38	0.4708
20	11 8.0	8 46	0.4852	5 14.5	184 0	3 1	0.4741
30	11 18.0	7 58	0.5064	4 45.1	185 42	3 24	0.4772
July 10	11 28.7	7 5	0.5258	4 16.4	187 23	3 46	0.4802
20	11 39.9	6 6	0.5434	3 48.3	189 2	4 8	0.4831
30	11 51.7	5 2	0.5591	3 20.6	190 41	4 29	0.4859
Aug. 9	12 3.8	3 56	0.5731	2 53.4	192 18	4 50	0.4886
19	12 16.3	2 47	0.5853	2 26.5	193 54	5 10	0.4912
29	12 29.0	1 36	0.5958	1 59.9	195 29	5 30	0.4937
Sept. 8	12 41.9	N. 0 25	0.6045	1 33.4	197 3	5 50	0.4961
18	12 55.0	S. 0 45	0.6114	1 7.2	198 36	6 9	0.4984
28	13 8.3	1 55	0.6167	0 41.0	200 8	6 27	0.5006
Oct. 8	13 21.7	3 3	0.6201	0 15.0	201 40	6 45	0.5027
18	13 35.1	4 8	0.6219	23 46.5	203 10	7 3	0.5048
28	13 48.5	5 10	0.6219	23 20.5	204 40	7 20	0.5067
Nov. 7	14 1.8	6 8	0.6201	22 54.5	206 10	7 37	0.5085
17	14 15.1	7 1	0.6166	22 28.3	207 38	7 53	0.5103
27	14 28.2	7 49	0.6112	22 2.0	209 7	8 9	0.5119
Dec. 7	14 41.0	8 30	0.6041	21 35.4	210 34	8 25	0.5134
17	14 53.5	9 5	0.5952	21 8.5	212 1	8 40	0.5149
27	15 5.4	S. 9 32	0.5844	20 41.0	213 28	8 54	0.5162
37	15 16.8	9 50	0.5720	20 13.0	214 54	N. 9 8	0.5175



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	+	"
Jan. 25	11 21 52.26	11 20 47.47	0.71	1 7 47.0	1 2 50.3	12.1	5.0
27	11 20 28.18	11 20 7.42	0.83	0 57 40.5	0 40 52.8	13.2	5.0
29	11 19 45.19	11 19 21.51	0.96	0 46 41.6	0 28 37.2	14.3	5.0
31	11 18 56.40	11 18 29.89	1.08	0 34 51.3	0 15 31.9	15.3	5.0
Feb. 2	11 18 2.00	11 17 32.77	1.19	0 22 10.7	0 1 38.4	16.4	5.0
4	11 17 2.21	11 16 30.37	1.30	0 8 41.0	0 13 1.2	17.4	5.0
				North.	North.		
6	11 15 57.28	11 15 22.97	1.40	0 5 35.8	0 28 24.8	18.3	5.1
8	11 14 47.48	11 14 10.85	1.50	0 20 37.7	0 44 30.0	19.2	5.1
10	11 13 33.13	11 12 54.35	1.59	0 36 22.4	1 1 13.8	20.1	5.1
12	11 12 14.56	11 11 33.82	1.68	0 52 47.3	1 18 33.3	20.9	5.1
14	11 10 52.16	11 10 9.64	1.75	1 9 49.3	1 36 25.1	21.7	5.2
16	11 9 26.30	11 8 42.19	1.82	1 27 25.4	1 54 45.8	22.3	5.2
18	11 7 57.36	11 7 11.87	1.88	1 45 32.1	2 13 31.8	23.0	5.2
20	11 6 25.76	11 5 39.09	1.93	2 4 5.9	2 32 39.1	23.5	5.2
22	11 4 51.91	11 4 4.28	1.98	2 23 3.0	2 52 4.1	23.9	5.2
24	11 3 16.25	11 2 27.89	2.01	2 42 19.7	3 11 42.3	24.3	5.2
26	11 1 39.24	11 0 50.38	2.03	3 1 51.8	3 31 29.8	24.5	5.2
28	11 0 1.36	10 59 12.24	2.04	3 21 35.2	3 51 22.1	24.7	5.2
Mar. 2	10 58 23.09	10 57 33.96	2.05	3 41 25.6	4 11 14.6	24.8	5.2
4	10 56 44.93	10 55 56.05	2.04	4 1 18.6	4 31 3.4	24.8	5.2
6	10 55 7.39	10 54 18.99	2.02	4 21 9.8	4 50 43.7	24.8	5.2
8	10 53 30.95	10 52 43.29	1.99	4 40 54.8	5 10 11.6	24.6	5.1
10	10 51 56.10	10 51 9.42	1.96	5 0 29.5	5 29 23.3	24.3	5.1
12	10 50 23.30	10 49 37.80	1.91	5 19 49.7	5 48 14.8	24.0	5.1
14	10 48 52.99	10 48 8.90	1.85	5 38 51.8	6 6 43.1	23.6	5.1
16	10 47 25.58	10 46 43.07	1.79	5 57 32.1	6 24 44.8	23.1	5.0
18	10 46 1.41	10 45 20.65	1.72	6 15 47.4	6 42 17.1	22.5	5.0
20	10 44 40.81	10 44 1.95	1.64	6 33 34.8	6 59 17.4	21.9	5.0
22	10 43 24.09	10 42 47.27	1.56	6 50 51.4	7 15 43.4	21.3	4.9
24	10 42 11.52	10 41 36.88	1.47	7 7 34.8	7 31 32.9	20.5	4.9
26	10 41 3.37	10 40 31.03	1.37	7 23 42.9	7 46 44.1	19.8	4.8
28	10 39 59.88	10 39 29.95	1.27	7 39 13.4	8 1 15.3	19.0	4.8
30	10 39 1.27	10 38 33.85	1.17	7 54 4.8	8 15 5.2	18.1	4.8
Apr. 1	10 38 7.72	10 37 42.90	1.06	8 8 15.5	8 28 12.4	17.3	4.7
3	10 37 19.41	10 36 57.25	0.95	8 21 44.2	8 40 36.3	16.4	4.7
5	10 36 36.45	10 36 17.02	0.84	8 34 29.8	8 52 16.0	15.5	4.6
7	10 35 58.98	10 35 42.32	0.72	8 46 31.7	9 3 11.1	14.6	4.6
9	10 35 27.05	10 35 13.17	0.61	8 57 49.1	9 13 21.7	13.6	4.6
11	10 35 0.70	10 34 49.63	0.49	9 8 22.0	9 22 47.5	12.7	4.5
13	10 34 39.96	10 34 31.69	0.37	9 18 10.2	9 31 29.0	11.8	4.4
15	10 34 24.80	10 34 19.30	0.26	9 27 13.8	9 39 26.2	10.9	4.4
17	10 34 15.18	10 34 12.42	0.14	9 35 33.1		9.9	4.3



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	—	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>+</sup> <sup>"</sup>	<sup>"</sup>
Apr. 19	10 34 11.03	10 34 10.98	0.03 +	North. 9 43 8.5	North. 9 46 40.0	9.0	4.3
21	10 34 12.28	10 34 14.93	0.08	9 50 0.7	9 53 10.7	8.1	4.2
23	10 34 18.90	10 34 24.19	0.19	9 56 10.0	9 58 58.7	7.2	4.2
25	10 34 30.79	10 34 38.69	0.30	10 1 37.0	10 4 4.8	6.4	4.1
27	10 34 47.88	10 34 58.35	0.41	10 6 22.4	10 8 29.6	5.5	4.1
29	10 35 10.09	10 35 23.08	0.52	10 10 26.7	10 12 13.7	4.7	4.0
May 1	10 35 37.32	10 35 52.78	0.62	10 13 50.8	10 15 18.1	3.8	4.0
3	10 36 9.46	10 36 27.35	0.72	10 16 35.6	10 17 43.5	3.0	3.9
5	10 36 46.43	10 37 6.68	0.82	10 18 41.8	10 19 30.7	2.2	3.9
7	10 37 28.10	10 37 50.66	0.92	10 20 10.3	10 20 40.7	1.5	3.8
9	10 38 14.34	10 38 39.13	1.01	10 21 2.0	10 21 14.4	0.7	3.8
11	10 39 5.02	10 39 31.97	1.10	10 21 17.9	10 21 12.7	0.0	3.7
						—	
13	10 39 59.98	10 40 29.03	1.19	10 20 59.0	10 20 36.9	0.7	3.6
15	10 40 59.09	10 41 30.15	1.27	10 20 6.4	10 19 27.8	1.4	3.6
17	10 42 2.20	10 42 35.22	1.35	10 18 41.1	10 17 46.4	2.1	3.5
19	10 43 9.19	10 43 44.09	1.43	10 16 43.8	10 15 33.5	2.8	3.5
21	10 44 19.91	10 44 56.64	1.51	10 14 15.6	10 12 50.2	3.4	3.4
23	10 45 34.25	10 46 12.75	1.59	10 11 17.4	10 9 37.4	4.0	3.4
25	10 46 52.11	10 47 32.31	1.66	10 7 50.1	10 5 55.7	4.6	3.3
27	10 48 13.35	10 48 55.21	1.73	10 3 54.3	10 1 46.0	5.2	3.3
29	10 49 37.88	10 50 21.34	1.79	9 59 30.9	9 57 9.0	5.8	3.3
31	10 51 5.58	10 51 50.59	1.86	9 54 40.6	9 52 5.7	6.3	3.3
June 2	10 52 36.36	10 53 22.87	1.92	9 49 24.4	9 46 36.8	6.9	3.2
4	10 54 10.11	10 54 58.06	1.98	9 43 43.0	9 40 43.0	7.4	3.2



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 15 11.2	S. 9 42	0.5784	h m 20 27.1	214 11	N. 9 1	0.5169
11	15 22.2	9 57	0.5651	19 58.7	215 37	9 15	0.5181
21	15 32.4	10 4	0.5501	19 29.4	217 3	9 29	0.5192
31	15 41.6	10 0	0.5336	18 59.1	218 29	9 42	0.5203
Feb. 10	15 49.5	9 48	0.5156	18 27.6	219 54	9 55	0.5212
20	15 56.0	9 26	0.4966	17 54.7	221 19	10 7	0.5221
Mar. 1	16 0.9	8 55	0.4769	17 20.1	222 43	10 19	0.5229
11	16 4.0	8 16	0.4568	16 43.7	224 8	10 30	0.5236
21	16 5.1	7 29	0.4372	16 5.3	225 32	10 41	0.5242
31	16 4.0	6 35	0.4187	15 24.8	226 56	10 52	0.5247
Apr. 10	16 0.8	5 37	0.4023	14 42.2	228 20	11 2	0.5251
20	15 55.6	4 37	0.3892	13 57.6	229 45	11 12	0.5254
30	15 48.9	3 40	0.3800	13 11.6	231 9	11 22	0.5256
May 10	15 41.1	2 48	0.3758	12 24.5	232 33	11 31	0.5258
20	15 33.0	2 7	0.3767	11 37.0	233 57	11 39	0.5259
30	15 25.1	1 39	0.3827	10 49.9	235 21	11 47	0.5259
June 9	15 18.2	1 24	0.3931	10 3.8	236 45	11 55	0.5258
19	15 12.8	1 24	0.4072	9 19.1	238 10	12 3	0.5256
29	15 9.1	1 38	0.4239	8 36.2	239 35	12 10	0.5253
July 9	15 7.4	2 4	0.4423	7 55.3	240 59	12 16	0.5249
19	15 7.7	2 40	0.4616	7 16.3	242 24	12 22	0.5244
29	15 9.8	3 23	0.4810	6 39.1	243 50	12 28	0.5239
Aug. 8	15 13.6	4 12	0.4999	6 3.6	245 15	12 34	0.5233
18	15 18.9	5 6	0.5181	5 29.7	246 41	12 39	0.5225
28	15 25.7	6 1	0.5352	4 57.2	248 8	12 43	0.5217
Sept. 7	15 33.8	6 57	0.5510	4 25.9	249 34	12 47	0.5208
17	15 43.0	7 53	0.5654	3 55.7	251 1	12 50	0.5198
27	15 53.2	8 47	0.5782	3 26.5	252 29	12 53	0.5188
Oct. 7	16 4.2	9 39	0.5895	2 58.2	253 57	12 56	0.5176
17	16 16.0	10 27	0.5991	2 30.7	255 25	12 58	0.5163
27	16 28.6	11 11	0.6070	2 3.8	256 54	13 0	0.5150
Nov. 6	16 41.7	11 50	0.6132	1 37.5	258 24	13 1	0.5135
16	16 55.2	12 23	0.6177	1 11.8	259 55	13 1	0.5120
26	17 9.2	12 50	0.6205	0 46.4	261 26	13 1	0.5104
Dec. 6	17 23.6	13 10	0.6215	0 21.3	262 57	13 1	0.5086
16	17 38.1	13 23	0.6207	23 54.0	264 30	13 0	0.5068
26	17 52.8	13 29	0.6183	23 29.3	266 3	12 58	0.5049
36	18 7.4	S. 13 28	0.6141	23 4.6	267 37	N. 12 56	0.5029



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	—	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
Apr. 6	16 2 7.21	16 145.62	0.87	5 56 56.7	5 51 4.6	14.6	3.5
8	16 1 22.83	16 0 58.85	0.97	5 45 11.2	5 39 16.7	14.7	3.5
10	16 0 33.69	16 0 7.36	1.07	5 33 21.1	5 27 24.7	14.8	3.5
12	15 59 39.88	15 59 11.27	1.17	5 21 27.6	5 15 30.0	14.9	3.5
14	15 58 41.54	15 58 10.71	1.26	5 9 32.3	5 3 34.6	14.9	3.6
16	15 57 38.80	15 57 5.83	1.35	4 57 37.1	4 51 40.0	14.9	3.6
18	15 56 31.83	15 55 56.82	1.44	4 45 43.7	4 39 48.2	14.8	3.6
20	15 55 20.83	15 54 43.88	1.52	4 33 53.8	4 28 0.9	14.7	3.6
22	15 54 6.00	15 53 27.24	1.60	4 22 9.6	4 16 20.1	14.6	3.6
24	15 52 47.60	15 52 7.13	1.67	4 10 32.8	4 4 47.9	14.4	3.6
26	15 51 25.87	15 50 43.85	1.74	3 59 5.5	3 53 26.1	14.2	3.7
28	15 50 1.11	15 49 17.68	1.80	3 47 49.7	3 42 16.7	13.9	3.7
30	15 48 33.60	15 47 48.91	1.85	3 36 47.2	3 31 21.6	13.6	3.7
May 2	15 47 3.64	15 46 17.84	1.90	3 26 0.1	3 20 42.9	13.3	3.7
4	15 45 31.53	15 44 44.77	1.94	3 15 30.2	3 10 22.2	12.9	3.7
6	15 43 57.58	15 43 10.00	1.97	3 5 19.1	3 0 21.3	12.5	3.7
8	15 42 22.08	15 41 33.86	2.00	2 55 28.8	2 50 41.8	12.1	3.8
10	15 40 45.38	15 39 56.67	2.02	2 46 0.7	2 41 25.6	11.6	3.8
12	15 39 7.79	15 38 18.77	2.04	2 36 56.7	2 32 34.3	11.1	3.8
14	15 37 29.65	15 36 40.49	2.05	2 28 18.4	2 24 9.4	10.5	3.8
16	15 35 51.32	15 35 2.18	2.05	2 20 7.3	2 16 12.3	9.9	3.8
18	15 34 13.12	15 33 24.18	2.04	2 12 24.7	2 8 44.6	9.3	3.8
20	15 32 35.41	15 31 46.85	2.03	2 5 12.1	2 1 47.4	8.7	3.8
22	15 30 58.56	15 30 10.55	2.01	1 58 30.7	1 55 22.0	8.0	3.7
24	15 29 22.89	15 28 35.63	1.98	1 52 21.4	1 49 29.2	7.3	3.7
26	15 27 48.78	15 27 2.40	1.94	1 46 45.4	1 44 10.1	6.6	3.7
28	15 26 16.52	15 25 31.18	1.90	1 41 43.3	1 39 25.1	5.9	3.7
30	15 24 46.41	15 24 2.26	1.85	1 37 15.5	1 35 14.7	5.2	3.7
June 1	15 23 18.75	15 22 35.91	1.80	1 33 22.5	1 31 39.1	4.5	3.6
3	15 21 53.77	15 21 12.36	1.74	1 30 4.5	1 28 38.7	3.8	3.6
5	15 20 31.71	15 19 51.84	1.68	1 27 21.6	1 26 13.3	3.0	3.6
7	15 19 12.79	15 18 34.58	1.61	1 25 13.8	1 24 23.1	2.3	3.6
9	15 17 57.22	15 17 20.76	1.54	1 23 41.1	1 23 7.8	1.6	3.6
11	15 16 45.20	15 16 10.58	1.46	1 22 43.2	1 22 27.3	0.8	3.5
13	15 15 36.92	15 15 4.24	1.38	1 22 20.0	1 22 21.3	0.1	3.5
15	15 14 32.55	15 14 1.88	1.30	1 22 31.1	1 22 49.4	0.6	3.5
17	15 13 32.25	15 13 3.67	1.21	1 23 16.0	1 23 51.0	1.3	3.5
19	15 12 36.16	15 12 9.73	1.12	1 24 34.2	1 25 25.6	2.0	3.5
21	15 11 44.40	15 11 20.18	1.03	1 26 25.1	1 27 32.6	2.6	3.4
23	15 10 57.09	15 10 35.13	0.94	1 28 48.0	1 30 11.2	3.3	3.4
25	15 10 14.32	15 9 54.65	0.84	1 31 42.1	1 33 20.5	3.9	3.4
27	15 9 36.13	15 9 18.76	0.75	1 35 6.4	1 36 59.6	4.6	3.4



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	—	
June 29	15 9 2.56	15 8 47.51	0.65	1 39 0.0	1 41 7.4	5.2	3.3
July 1	15 8 33.63	15 8 20.91	0.55	1 43 21.8	1 45 43.0	5.7	3.3
3	15 8 9.35	15 7 58.96	0.46	1 48 10.9	1 50 45.3	6.3	3.3
5	15 7 49.73	15 7 41.66	0.36	1 53 26.2	1 56 13.4	6.8	3.3
7	15 7 34.76	15 7 29.01	0.26	1 59 6.8	2 2 6.2	7.3	3.2
9	15 7 24.42	15 7 20.98	0.17	2 5 11.5	2 8 22.7	7.8	3.2
11	15 7 18.70	15 7 17.57	0.07	2 11 39.6	2 15 2.0	8.3	3.2
			+				
13	15 7 17.58	15 7 18.73	0.02	2 18 29.9	2 22 3.2	8.8	3.1
15	15 7 21.02	15 7 24.45	0.12	2 25 41.6	2 29 25.1	9.2	3.1
17	15 7 29.01	15 7 34.70	0.21	2 33 13.7	2 37 7.1	9.6	3.1
19	15 7 41.51	15 7 49.44	0.31	2 41 5.2	2 45 7.9	10.0	3.1
21	15 7 58.48	15 8 8.62	0.40	2 49 15.1	2 53 26.7	10.4	3.0
23	15 8 19.86	15 8 32.18	0.49	2 57 42.4	3 2 2.2	10.7	3.0
25	15 8 45.58	15 9 0.04	0.58	3 6 26.0	3 10 53.6	11.1	3.0
27	15 9 15.56	15 9 32.12	0.67	3 15 24.9	3 19 59.8	11.4	3.0
29	15 9 49.71	15 10 8.33	0.75	3 24 38.2	3 29 19.9	11.7	2.9
31	15 10 27.96	15 10 48.60	0.84	3 34 4.8	3 38 52.8	11.9	2.9
Aug. 2	15 11 10.23	15 11 32.85	0.92	3 43 43.9	3 48 37.9	12.2	2.9
4	15 11 56.44	15 12 21.00	1.00	3 53 34.6	3 58 34.0	12.4	2.9
6	15 12 46.52	15 13 12.98	1.08	4 3 36.0	4 8 40.4	12.6	2.8
8	15 13 40.38	15 14 8.72	1.16	4 13 47.2	4 18 56.3	12.8	2.8



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 18 1.6	S. 13 29	0.6160	h m 23 14.4	267 0	N. 12 57	0.5037
11	18 16.3	13 23	0.6107	22 49.8	268 34	12 55	0.5016
21	18 30.8	13 10	0.6036	22 24.9	270 10	12 51	0.4994
31	18 45.1	12 50	0.5947	21 59.8	271 46	12 48	0.4972
Feb. 10	18 59.1	12 22	0.5841	21 34.4	273 23	12 43	0.4948
20	19 12.7	11 49	0.5716	21 8.6	275 2	12 38	0.4923
Mar. 2	19 25.8	11 10	0.5573	20 42.2	276 41	12 33	0.4898
12	19 38.2	10 25	0.5413	20 15.2	278 22	12 26	0.4871
22	19 49.8	9 37	0.5234	19 47.4	280 3	12 19	0.4843
Apr. 1	20 0.6	8 45	0.5039	19 18.7	281 46	12 12	0.4815
11	20 10.3	7 52	0.4826	18 49.0	283 31	12 3	0.4785
21	20 18.8	6 58	0.4597	18 18.0	285 16	11 54	0.4754
May 1	20 25.9	6 4	0.4355	17 45.7	287 3	11 44	0.4723
11	20 31.5	5 14	0.4100	17 11.8	288 52	11 33	0.4690
21	20 35.3	4 29	0.3837	16 36.1	290 42	11 21	0.4656
31	20 37.1	3 50	0.3571	15 58.5	292 33	11 8	0.4621
June 10	20 36.8	3 23	0.3309	15 18.7	294 27	10 54	0.4585
20	20 34.2	3 8	0.3060	14 36.7	296 22	10 40	0.4549
30	20 29.5	3 9	0.2838	13 52.5	298 19	10 24	0.4511
July 10	20 22.8	3 28	0.2653	13 6.4	300 17	10 8	0.4472
20	20 14.6	4 4	0.2521	12 19.0	302 18	9 50	0.4432
30	20 5.9	4 58	0.2449	11 31.0	304 21	9 32	0.4391
Aug. 9	19 57.5	6 4	0.2443	10 43.3	306 26	9 12	0.4349
19	19 50.3	7 19	0.2500	9 56.9	308 33	8 51	0.4306
29	19 45.0	8 36	0.2610	9 12.4	310 42	8 29	0.4262
Sept. 8	19 42.3	9 51	0.2763	8 30.5	312 54	8 6	0.4217
18	19 42.3	10 59	0.2944	7 51.2	315 8	7 42	0.4172
28	19 45.0	11 59	0.3141	7 14.7	317 25	7 16	0.4125
Oct. 8	19 50.3	12 49	0.3345	6 40.7	319 44	6 49	0.4078
18	19 57.9	13 27	0.3546	6 9.1	322 7	6 21	0.4030
28	20 7.7	13 53	0.3741	5 39.5	324 32	5 51	0.3982
Nov. 7	20 19.3	14 7	0.3925	5 11.8	327 1	5 21	0.3932
17	20 32.4	14 8	0.4095	4 45.6	329 32	4 49	0.3883
27	20 46.9	13 56	0.4251	4 20.7	332 7	4 15	0.3833
Dec. 7	21 2.5	13 33	0.4390	3 56.9	334 45	3 40	0.3782
17	21 19.0	12 58	0.4514	3 34.1	337 27	3 4	0.3732
27	21 36.3	12 12	0.4621	3 12.0	340 12	2 27	0.3681
37	21 54.3	S. 11 15	0.4713	2 50.6	343 1	N. 1 48	0.3630



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	—	<i>South.</i>	<i>South.</i>	<i>+</i>	<i>"</i>
June 14	20 35 53.70	20 35 38.09	0.62	3 13 59.7	3 12 32.0	3.8	4.3
16	20 35 21.13	20 35 2.84	0.73	3 11 13.0	3 10 3.0	3.1	4.3
18	20 34 43.23	20 34 22.30	0.84	3 9 2.0	3 8 10.3	2.3	4.4
20	20 34 0.05	20 33 36.49	0.95	3 7 27.9	3 6 55.0	1.6	4.4
22	20 33 11.64	20 32 45.51	1.06	3 6 31.7	3 6 18.2	0.8	4.5
24	20 32 18.10	20 31 49.43	1.17	3 6 14.5	3 6 20.9	0.1	4.5
26	20 31 19.50	20 30 48.34	1.27	3 6 37.4	3 7 4.1	0.9	4.6
28	20 30 15.96	20 29 42.38	1.37	3 7 41.2	3 8 28.7	1.8	4.6
30	20 29 7.62	20 28 31.69	1.47	3 9 26.8	3 10 35.5	2.6	4.7
July 2	20 27 54.63	20 27 16.46	1.57	3 11 55.0	3 13 25.3	3.5	4.7
4	20 26 37.21	20 25 56.91	1.66	3 15 6.5	3 16 58.5	4.4	4.7
6	20 25 15.58	20 24 33.25	1.74	3 19 1.5	3 21 15.5	5.4	4.8
8	20 23 49.98	20 23 5.79	1.82	3 23 40.4	3 26 16.4	6.3	4.8
10	20 22 20.73	20 21 34.84	1.89	3 29 3.3	3 32 1.2	7.2	4.8
12	20 20 48.17	20 20 0.77	1.96	3 35 10.0	3 38 29.6	8.1	4.9
14	20 19 12.67	20 18 23.93	2.02	3 41 59.9	3 45 40.9	9.0	4.9
16	20 17 34.59	20 16 44.69	2.07	3 49 32.5	3 53 34.5	9.9	4.9
18	20 15 54.30	20 15 3.46	2.11	3 57 46.8	4 2 9.3	10.7	5.0
20	20 14 12.21	20 13 20.62	2.14	4 6 41.8	4 11 24.2	11.6	5.0
22	20 12 28.74	20 11 36.60	2.17	4 16 16.3	4 21 17.9	12.4	5.0
24	20 10 44.28	20 9 51.81	2.19	4 26 28.8	4 31 48.9	13.2	5.1
26	20 8 59.27	20 8 6.69	2.19	4 37 17.9	4 42 55.6	13.9	5.1
28	20 7 14.13	20 6 21.66	2.19	4 48 41.7	4 54 36.1	14.6	5.1
30	20 5 29.32	20 4 37.17	2.18	5 0 38.5	5 6 48.6	15.3	5.1
Aug. 1	20 3 45.27	20 2 53.68	2.16	5 13 6.2	5 19 31.0	15.9	5.1
3	20 2 2.46	20 1 11.67	2.13	5 26 2.8	5 32 41.1	16.5	5.1
5	20 0 21.36	19 59 31.60	2.08	5 39 25.8	5 46 16.5	17.0	5.1
7	19 58 42.44	19 57 53.94	2.03	5 53 12.8	6 0 14.5	17.5	5.1
9	19 57 6.16	19 56 19.14	1.97	6 7 21.2	6 14 32.5	17.9	5.1
11	19 55 32.95	19 54 47.64	1.91	6 21 48.2	6 29 7.9	18.2	5.1
13	19 54 3.26	19 53 19.84	1.83	6 36 31.3	6 43 58.0	18.5	5.1
15	19 52 37.44	19 51 56.10	1.74	6 51 27.7	6 59 0.1	18.8	5.1
17	19 51 15.86	19 50 36.76	1.65	7 6 34.7	7 14 11.3	19.0	5.0
19	19 49 58.84	19 49 22.13	1.55	7 21 49.6	7 29 29.3	19.1	5.0
21	19 48 46.67	19 48 12.49	1.45	7 37 10.0	7 44 51.5	19.2	5.0
23	19 47 39.63	19 47 8.10	1.34	7 52 33.4	8 0 15.5	19.3	5.0
25	19 46 37.95	19 46 9.19	1.23	8 7 57.6	8 15 39.3	19.2	4.9
27	19 45 41.86	19 45 15.97	1.11	8 23 20.3	8 31 0.3	19.1	4.9
29	19 44 51.55	19 44 28.62	0.99	8 38 39.1	8 46 16.6	18.9	4.9
31	19 44 7.21	19 43 47.34	0.86	8 53 52.3	9 1 26.0	18.7	4.9
Sept. 2	19 43 29.04	19 43 12.31	0.73	9 8 57.6	9 16 26.7	18.5	4.8
4	19 42 57.17	19 42 43.65	0.59	9 23 53.1	9 31 16.6		



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>"</i>	<i>South.</i>	<i>South.</i>	<i>"</i>	<i>"</i>
Sept. 6	19 42 31.75	19 42 21.49	0.46	9 38 37.0	9 45 54.1	18.3	4.7
8	19 42 12.86	19 42 5.88	0.33	9 53 7.5	10 0 17.3	18.0	4.7
10	19 42 0.56	19 41 56.89	0.19	10 7 23.2	10 14 24.9	17.7	4.7
12	19 41 54.87	19 41 54.51	0.05	10 21 22.3	10 28 15.3	17.3	4.6
			+				
14	19 41 55.80	19 41 58.75	0.09	10 35 3.6	10 41 47.1	16.9	4.6
16	19 42 3.34	19 42 9.58	0.23	10 48 25.7	10 54 59.2	16.5	4.6
18	19 42 17.44	19 42 26.94	0.36	11 1 27.5	11 7 50.6	16.1	4.5
20	19 42 38.05	19 42 50.79	0.50	11 14 8.2	11 20 20.3	15.6	4.5
22	19 43 5.13	19 43 21.05	0.63	11 26 26.7	11 32 27.4	15.1	4.5
24	19 43 38.57	19 43 57.67	0.76	11 38 22.3	11 44 11.3	14.7	4.4
26	19 44 18.34	19 44 40.57	0.89	11 49 54.2	11 55 31.1	14.2	4.4
28	19 45 4.36	19 45 29.69	1.02	12 1 1.7	12 6 26.1	13.6	4.3
30	19 45 56.55	19 46 24.93	1.15	12 11 44.2	12 16 55.8	13.1	4.3
Oct. 2	19 46 54.83	19 47 26.23	1.28	12 22 0.9	12 26 59.5	12.6	4.3
4	19 47 59.12	19 48 33.49	1.40	12 31 51.3	12 36 36.5	12.0	4.2
6	19 49 9.33	19 49 46.61	1.52	12 41 15.0	12 45 46.6	11.5	4.2
8	19 50 25.33	19 51 5.46	1.64	12 50 11.3	12 54 29.0	10.9	4.2
10	19 51 46.99	19 52 29.91	1.76	12 58 39.8	13 2 43.6	10.3	4.1
12	19 53 14.19	19 53 59.81	1.87	13 6 40.3	13 10 29.9	9.7	4.1
14	19 54 46.77	19 55 35.04	1.98	13 14 12.4	13 17 47.7	9.1	4.0
16	19 56 24.60	19 57 15.43	2.09	13 21 15.9	13 24 36.9	8.5	4.0
18	19 58 7.53	19 59 0.86	2.20	13 27 50.7	13 30 57.1	7.9	3.9
20	19 59 55.43	20 0 51.20	2.30	13 33 56.4	13 36 48.4	7.3	3.9



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 21 45.2	S. 11 45	0.4669	h m 3 1.2	° ' " 341.36	N. 2 8	0.3655
11	22 3.5	10 43	0.4752	2 40.1	344 27	1 29	0.3605
21	22 22.2	9 32	0.4820	2 19.4	347 22	0 48	0.3555
31	22 41.3	8 13	0.4874	1 59.1	350 21	N. 0 7	0.3505
Feb. 10	23 0.7	6 47	0.4913	1 39.1	353 24	S. 0 35	0.3456
20	23 20.5	5 15	0.4938	1 19.5	356 31	1 18	0.3408
Mar. 2	23 40.6	3 39	0.4950	1 0.2	359 43	2 2	0.3361
12	0 0.9	1 59	0.4950	0 41.2	2 59	2 47	0.3315
22	0 21.5	S. 0 17	0.4938	0 22.4	6 19	3 31	0.3271
Apr. 1	0 42.5	N. 1 25	0.4915	0 3.9	9 43	4 16	0.3229
11	1 3.7	3 6	0.4882	23 43.9	13 12	5 1	0.3189
21	1 25.2	4 45	0.4839	23 26.1	16 45	5 46	0.3152
May 1	1 47.1	6 20	0.4787	23 8.6	20 22	6 30	0.3117
11	2 9.3	7 49	0.4726	22 51.4	24 3	7 13	0.3085
21	2 31.8	9 11	0.4656	22 34.5	27 48	7 55	0.3057
31	2 54.6	10 24	0.4579	22 17.9	31 37	8 35	0.3031
June 10	3 17.6	11 28	0.4494	22 1.5	35 28	9 14	0.3010
20	3 40.8	12 20	0.4401	21 45.3	39 23	9 50	0.2992
30	4 4.1	13 0	0.4301	21 29.2	43 21	10 24	0.2978
July 10	4 27.4	13 26	0.4193	21 13.1	47 20	10 55	0.2968
20	4 50.5	13 39	0.4078	20 56.8	51 21	11 23	0.2963
30	5 13.4	13 38	0.3954	20 40.2	55 23	11 48	0.2962
Aug. 9	5 35.8	13 23	0.3822	20 23.2	59 26	12 9	0.2965
19	5 57.6	12 54	0.3681	20 5.6	63 29	12 27	0.2972
29	6 18.7	12 13	0.3530	19 47.2	67 31	12 41	0.2984
Sept. 8	6 38.8	11 20	0.3368	19 27.8	71 32	12 51	0.3000
18	6 57.8	10 17	0.3195	19 7.3	75 31	12 58	0.3020
28	7 15.4	9 6	0.3010	18 45.5	79 28	13 1	0.3043
Oct. 8	7 31.5	7 48	0.2814	18 22.0	83 23	13 1	0.3070
18	7 45.9	6 27	0.2605	17 56.8	87 14	12 57	0.3100
28	7 58.2	5 5	0.2385	17 29.5	91 2	12 49	0.3134
Nov. 7	8 8.1	3 46	0.2157	16 59.9	94 45	12 39	0.3170
17	8 15.4	2 33	0.1924	16 27.7	98 25	12 26	0.3209
27	8 19.7	1 32	0.1693	15 52.5	102 0	12 10	0.3250
Dec. 7	8 20.9	0 47	0.1475	15 14.1	105 31	11 52	0.3293
17	8 18.8	0 25	0.1285	14 32.5	108 57	11 32	0.3338
27	8 13.7	0 29	0.1139	13 48.0	112 19	11 10	0.3384
37	8 6.2	N. 1 2	0.1058	13 1.1	115 35	S. 10 46	0.3431



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	<i>Apparent</i> Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	<i>Apparent</i> Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<i>North.</i> ° ' "	<i>North.</i> ° ' "	<sup>"</sup>	<sup>"</sup>
Dec. 11	8 20 16.89	8 20 4.13	0.49	0 33 48.6	0 31 33.9	5.9	6.5
13	8 19 49.45	8 19 32.88	0.65	0 29 33.9	0 27 49.1	4.7	6.5
15	8 19 14.42	8 18 54.10	0.81	0 26 19.8	0 25 6.1	3.4	6.6
17	8 18 31.92	8 18 7.92	0.96	0 24 8.4	0 23 26.9	2.1	6.7
19	8 17 42.12	8 17 14.56	1.11	0 23 1.9	0 22 53.6	0.7	6.7
					+		
21	8 16 45.27	8 16 14.29	1.26	0 23 2.3	0 23 28.0	0.7	6.8
23	8 15 41.66	8 15 7.43	1.39	0 24 11.0	0 25 11.4	2.2	6.8
25	8 14 31.65	8 13 54.36	1.52	0 26 29.4	0 28 4.9	3.6	6.9
27	8 13 15.62	8 12 35.48	1.64	0 29 58.1	0 32 9.0	5.1	6.9
29	8 11 54.01	8 11 11.26	1.75	0 34 37.7	0 37 24.2	6.6	6.9
31	8 10 27.30	8 9 42.18	1.86	0 40 28.3	0 43 50.1	8.0	6.9



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 23 26.8	S. 10 45	0.4233	h m 4 43.6	10 4	S. 7 7	0.3894
11	23 40.5	9 0	0.4435	4 17.9	12 35	7 8	0.3909
21	23 54.7	7 12	0.4618	3 52.8	15 5	7 8	0.3924
31	0 9.4	5 22	0.4782	3 28.1	17 35	7 7	0.3938
Feb. 10	0 24.5	3 30	0.4928	3 3.8	20 3	7 5	0.3952
20	0 40.0	S. 1 38	0.5056	2 39.9	22 30	7 2	0.3965
Mar. 2	0 55.8	N. 0 13	0.5167	2 16.3	24 57	6 59	0.3978
12	1 11.8	2 2	0.5261	1 53.0	27 22	6 55	0.3990
22	1 28.1	3 50	0.5338	1 29.9	29 47	6 51	0.4002
Apr. 1	1 44.6	5 34	0.5400	1 6.9	32 11	6 45	0.4013
11	2 1.2	7 15	0.5445	0 44.2	34 34	6 39	0.4023
21	2 18.0	8 51	0.5475	0 21.6	36 56	6 33	0.4033
May 1	2 35.0	10 21	0.5490	23 57.0	39 18	6 25	0.4043
11	2 52.1	11 46	0.5490	23 34.7	41 39	6 17	0.4051
21	3 9.3	13 5	0.5474	23 12.5	43 59	6 9	0.4059
31	3 26.5	14 17	0.5443	22 50.4	46 19	6 0	0.4066
June 10	3 43.8	15 22	0.5397	22 28.2	48 38	5 50	0.4073
20	4 1.0	16 19	0.5336	22 6.0	50 57	5 40	0.4079
July 30	4 18.0	17 8	0.5259	21 43.7	53 16	5 29	0.4085
July 10	4 34.9	17 50	0.5166	21 21.1	55 34	5 18	0.4089
20	4 51.5	18 24	0.5057	20 58.3	57 51	5 6	0.4095
30	5 7.7	18 51	0.4931	20 35.1	60 8	4 54	0.4097
Aug. 9	5 23.4	19 11	0.4787	20 11.4	62 25	4 42	0.4100
19	5 38.5	19 24	0.4626	19 47.0	64 42	4 29	0.4102
29	5 52.7	19 31	0.4448	19 21.7	66 59	4 15	0.4103
Sept. 8	6 5.9	19 34	0.4251	18 55.5	69 15	4 1	0.4104
18	6 18.0	19 33	0.4037	18 28.1	71 32	3 47	0.4104
28	6 28.6	19 30	0.3806	17 59.2	73 48	3 32	0.4103
Oct. 8	6 37.4	19 26	0.3559	17 28.5	76 4	3 17	0.4102
18	6 44.2	19 24	0.3300	16 55.8	78 20	3 2	0.4100
28	6 48.6	19 25	0.3034	16 20.6	80 37	2 47	0.4097
Nov. 7	6 50.2	19 32	0.2769	15 42.7	82 53	2 31	0.4094
17	6 48.8	19 45	0.2517	15 1.9	85 10	2 15	0.4090
27	6 44.3	20 4	0.2292	14 17.9	87 27	1 59	0.4085
Dec. 7	6 36.8	20 30	0.2112	13 31.0	89 44	1 42	0.4080
17	6 27.0	21 1	0.1995	12 41.8	92 2	1 25	0.4074
27	6 15.9	21 33	0.1954	11 51.4	94 20	1 8	0.4067
37	6 4.8	N. 22 5	0.1994	11 1.1	96 38	S. 0 51	0.4060



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>s</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>+</i> <i>"</i>	<i>"</i>
Nov. 17	6 48 37.17	6 48 17.47	0.78	19 45 32.4	19 47 14.7	4.2	5.0
19	6 47 55.89	6 47 32.42	0.94	19 49 1.2	19 50 52.0	4.5	5.1
21	6 47 7.07	6 46 39.84	1.10	19 52 47.0	19 54 46.2	4.9	5.1
23	6 46 10.75	6 45 39.81	1.25	19 56 49.5	19 58 56.9	5.2	5.2
25	6 45 7.03	6 44 32.44	1.40	20 1 8.3	20 3 23.6	5.6	5.2
27	6 43 56.05	6 43 17.89	1.55	20 5 42.9	20 8 6.0	5.9	5.3
29	6 42 37.99	6 41 56.37	1.70	20 10 32.8	20 13 3.1	6.2	5.3
Dec. 1	6 41 13.08	6 40 28.15	1.84	20 15 37.0	20 18 14.3	6.5	5.4
3	6 39 41.61	6 38 53.50	1.97	20 20 54.9	20 23 38.6	6.8	5.4
5	6 38 3.88	6 37 12.77	2.10	20 26 25.3	20 29 14.9	7.0	5.4
7	6 36 20.24	6 35 26.33	2.22	20 32 7.2	20 35 2.2	7.2	5.5
9	6 34 31.09	6 33 34.57	2.33	20 37 59.6	20 40 59.3	7.4	5.5
11	6 32 36.84	6 31 37.94	2.43	20 44 1.1	20 47 4.9	7.6	5.5
13	6 30 37.93	6 29 36.89	2.52	20 50 10.5	20 53 17.6	7.8	5.6
15	6 28 34.86	6 27 31.92	2.60	20 56 26.2	20 59 36.2	7.9	5.6
17	6 26 28.15	6 25 23.61	2.67	21 2 47.2	21 5 59.1	8.0	5.6
19	6 24 18.38	6 23 12.53	2.73	21 9 11.8	21 12 25.1	8.0	5.6
21	6 22 6.14	6 20 59.31	2.78	21 15 38.8	21 18 52.7	8.1	5.7
23	6 19 52.11	6 18 44.63	2.81	21 22 6.7	21 25 20.7	8.1	5.7
25	6 17 36.97	6 16 29.19	2.82	21 28 34.5	21 31 48.0	8.1	5.7
27	6 15 21.41	6 14 13.71	2.82	21 35 1.1	21 38 13.6	8.0	5.7
29	6 13 6.17	6 11 58.88	2.81	21 41 25.3	21 44 36.2	8.0	5.7
31	6 10 51.93	6 9 45.40	2.78	21 47 46.3	21 50 55.3	7.9	5.7



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 6 <sup>m</sup> 10.3	N. 21 49	0.1963	<sup>h</sup> 11 <sup>m</sup> 26.1	<sup>o</sup> 95 29	S. 1 0	0.4063
11	5 59.8	22 20	0.2042	10 36.5	97 47	0 42	0.4055
21	5 51.4	22 48	0.2190	9 48.9	100 6	0 25	0.4047
31	5 45.5	23 14	0.2389	9 3.9	102 26	S. 0 8	0.4038
Feb. 10	5 43.1	23 38	0.2623	8 22.2	104 46	N. 0 10	0.4029
20	5 43.9	24 0	0.2875	7 43.8	107 7	0 28	0.4019
Mar. 1	5 47.8	24 21	0.3131	7 8.5	109 28	0 45	0.4008
11	5 54.4	24 39	0.3383	6 35.8	111 50	1 3	0.3997
21	6 3.3	24 54	0.3624	6 5.4	114 13	1 20	0.3985
31	6 14.3	25 6	0.3851	5 37.1	116 37	1 38	0.3973
Apr. 10	6 26.9	25 12	0.4062	5 10.4	119 2	1 56	0.3960
20	6 41.0	25 11	0.4255	4 45.1	121 28	2 13	0.3946
30	6 56.2	25 4	0.4431	4 21.0	123 54	2 30	0.3932
May 10	7 12.4	24 49	0.4589	3 57.8	126 22	2 47	0.3918
20	7 29.3	24 26	0.4729	3 35.3	128 51	3 4	0.3903
30	7 46.8	23 55	0.4852	3 13.4	131 21	3 21	0.3887
June 9	8 4.7	23 15	0.4959	2 51.9	133 52	3 38	0.3871
19	8 23.0	22 26	0.5050	2 30.8	136 24	3 54	0.3855
29	8 41.4	21 29	0.5126	2 9.8	138 57	4 9	0.3838
July 9	9 0.0	20 25	0.5186	1 49.0	141 32	4 25	0.3821
19	9 18.7	19 13	0.5232	1 28.3	144 8	4 40	0.3804
29	9 37.3	17 53	0.5263	1 7.6	146 46	4 54	0.3786
Aug. 8	9 56.0	16 27	0.5280	0 46.8	149 25	5 8	0.3768
18	10 14.6	14 56	0.5284	0 26.0	152 5	5 22	0.3750
28	10 33.1	13 20	0.5273	0 5.2	154 47	5 35	0.3732
Sept. 7	10 51.6	11 40	0.5249	23 42.2	157 30	5 47	0.3714
17	11 10.0	9 56	0.5210	23 21.2	160 15	5 59	0.3695
27	11 28.4	8 10	0.5158	23 0.1	163 2	6 10	0.3676
Oct. 7	11 46.6	6 24	0.5091	22 39.0	165 50	6 20	0.3657
17	12 4.8	4 37	0.5010	22 17.8	168 39	6 29	0.3639
27	12 23.0	2 51	0.4913	21 56.6	171 30	6 37	0.3620
Nov. 6	12 41.1	N. 1 8	0.4802	21 35.2	174 23	6 45	0.3602
16	12 59.0	S. 0 32	0.4675	21 13.8	177 17	6 51	0.3583
26	13 16.9	2 8	0.4532	20 52.3	180 13	6 57	0.3565
Dec. 6	13 34.6	3 39	0.4373	20 30.5	183 10	7 1	0.3547
16	13 52.0	5 2	0.4197	20 8.5	186 9	7 4	0.3530
26	14 9.1	6 18	0.4004	19 46.2	189 9	7 7	0.3513
36	14 25.7	S. 7 25	0.3792	19 23.4	192 11	N. 7 8	0.3496



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>+</sup> <sup>"</sup>	<sup>"</sup>
Jan. 1	6 9 45.40	6 8 39.39	2.76	21 50 55.3	21 54 3.2	7.9	5.7
3	6 7 33.97	6 6 29.21	2.71	21 57 9.9	22 0 15.3	7.8	5.6
5	6 5 25.20	6 4 21.99	2.65	22 3 19.5	22 6 22.4	7.6	5.6
7	6 3 19.68	6 2 18.34	2.58	22 9 23.8	22 12 23.8	7.5	5.6
9	6 1 18.03	6 0 18.80	2.49	22 15 22.3	22 18 19.3	7.4	5.6
11	5 59 20.74	5 58 23.90	2.39	22 21 14.8	22 24 8.7	7.3	5.5
13	5 57 28.34	5 56 34.11	2.29	22 27 1.1	22 29 51.9	7.2	5.5
15	5 55 41.28	5 54 49.90	2.17	22 32 41.2	22 35 29.0	7.0	5.5
17	5 54 0.02	5 53 11.70	2.05	22 38 15.3	22 41 0.0	6.9	5.4
19	5 52 24.98	5 51 39.91	1.91	22 43 43.3	22 46 25.2	6.8	5.4
21	5 50 56.54	5 50 14.89	1.77	22 49 5.6	22 51 44.6	6.7	5.4
23	5 49 35.02	5 48 56.94	1.62	22 54 22.2	22 56 58.5	6.5	5.3
25	5 48 20.69	5 47 46.31	1.47	22 59 33.5	23 2 7.3	6.4	5.3
27	5 47 13.82	5 46 43.23	1.31	23 4 39.8	23 7 11.2	6.3	5.2
29	5 46 14.57	5 45 47.85	1.15	23 9 41.5	23 12 10.7	6.2	5.2
31	5 45 23.08	5 45 0.28	0.99	23 14 38.8	23 17 5.9	6.1	5.1
Feb. 2	5 44 39.46	5 44 20.60	0.83	23 19 32.0	23 21 57.1	6.0	5.1
4	5 44 3.72	5 43 48.81	0.66	23 24 21.3	23 26 44.5	5.9	5.0
6	5 43 35.88	5 43 24.91	0.50	23 29 6.8	23 31 28.3	5.8	5.0
8	5 43 15.90	5 43 8.85	0.33	23 33 48.9	23 36 8.6	5.8	4.9
10	5 43 3.75	5 43 0.59	0.17	23 38 27.4	23 40 45.2	5.7	4.9
12	5 42 59.37	5 43 0.07	0.01	23 43 2.2	23 45 18.3	5.7	4.8
			+				
14	5 43 2.69	5 43 7.21	0.15	23 47 33.4	23 49 47.6	5.6	4.8
16	5 43 13.62	5 43 21.91	0.31	23 52 1.0	23 54 13.5	5.5	4.7
18	5 43 32.08	5 43 44.11	0.46	23 56 25.1	23 58 35.8	5.5	4.7
20	5 43 57.98	5 44 13.68	0.62	24 0 45.6	24 2 54.4	5.4	4.6
22	5 44 31.20	5 44 50.52	0.77	24 5 2.2	24 7 9.0	5.3	4.6
24	5 45 11.61	5 45 34.47	0.92	24 9 14.7	24 11 19.2	5.2	4.5
26	5 45 59.06	5 46 25.38	1.06	24 13 22.6	24 15 24.8	5.1	4.5
28	5 46 53.38	5 47 23.06	1.20	24 17 25.8	24 19 25.5	5.0	4.4
Mar. 1	5 47 54.39	5 48 27.34	1.34	24 21 23.9	24 23 21.0	4.9	4.4
3	5 49 1.89	5 49 38.02	1.47	24 25 16.8	24 27 11.1	4.8	4.3
5	5 50 15.70	5 50 54.92	1.60	24 29 3.9	24 30 55.1	4.7	4.3
7	5 51 35.65	5 52 17.86	1.73	24 32 44.7	24 34 32.7	4.5	4.2
9	5 53 1.53	5 53 46.64	1.85	24 36 18.9	24 38 3.3	4.4	4.2
11	5 54 33.18	5 55 21.11	1.97	24 39 45.8	24 41 26.5	4.2	4.1
13	5 56 10.43	5 57 1.10	2.08	24 43 5.2	24 44 41.8	4.1	4.1
15	5 57 53.11	5 58 46.44	2.19	24 46 16.4	24 47 48.9	3.9	4.0
17	5 59 41.07	6 0 36.98	2.30	24 49 19.1	24 50 47.0	3.7	4.0
19	6 1 34.15	6 2 32.57	2.41	24 52 12.6	24 53 35.8	3.5	3.9
21	6 3 32.22	6 4 33.07	2.51	24 54 56.5	24 56 14.7	3.3	3.9
23	6 5 35.11		2.61	24 57 30.3		3.1	3.9



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
	h m	° '		h m	° '	° '	
Jan. 1	14 19.2	S. 7 0	0.3879	19 32.6	190 58	N. 7 8	0.3502
11	14 35.5	8 1	0.3657	19 9.4	194 1	7 8	0.3486
21	14 51.0	8 53	0.3417	18 45.6	197 4	7 7	0.3470
31	15 5.6	9 34	0.3161	18 20.7	200 10	7 5	0.3454
Feb. 10	15 19.0	10 3	0.2887	17 54.6	203 16	7 2	0.3440
20	15 30.9	10 22	0.2598	17 27.0	206 24	6 57	0.3426
Mar. 2	15 40.9	10 30	0.2298	16 57.5	209 32	6 51	0.3412
12	15 48.6	10 28	0.1990	16 25.6	212 42	6 44	0.3400
22	15 53.6	10 16	0.1682	15 51.1	215 53	6 36	0.3388
Apr. 1	15 55.6	9 56	0.1384	15 13.6	219 5	6 26	0.3377
11	15 54.3	9 32	0.1113	14 32.8	222 17	6 15	0.3367
21	15 49.7	9 5	0.0885	13 48.7	225 30	6 3	0.3358
May 1	15 42.4	8 41	0.0722	13 2.0	228 44	5 50	0.3350
11	15 33.1	8 24	0.0638	12 13.4	231 58	5 35	0.3344
21	15 23.3	8 19	0.0645	11 24.3	235 13	5 20	0.3338
31	15 14.3	8 28	0.0738	10 36.1	238 28	5 3	0.3333
June 10	15 7.3	8 54	0.0906	9 50.0	241 43	4 46	0.3329
20	15 3.2	9 35	0.1130	9 6.7	244 58	4 27	0.3327
30	15 2.2	10 29	0.1391	8 26.4	248 14	4 8	0.3326
July 10	15 4.3	11 35	0.1673	7 49.3	251 29	3 47	0.3325
20	15 9.3	12 48	0.1962	7 15.1	254 44	3 26	0.3326
30	15 17.0	14 6	0.2250	6 43.5	257 58	3 5	0.3329
Aug. 9	15 27.0	15 27	0.2530	6 14.2	261 13	2 43	0.3332
19	15 39.1	16 48	0.2799	5 46.9	264 27	2 20	0.3336
29	15 52.9	18 7	0.3054	5 21.4	267 40	1 57	0.3342
Sept. 8	16 8.3	19 22	0.3294	4 57.5	270 53	1 34	0.3348
18	16 25.1	20 32	0.3519	4 34.9	274 4	1 10	0.3356
28	16 43.1	21 34	0.3729	4 13.6	277 16	0 46	0.3365
Oct. 8	17 2.2	22 27	0.3924	3 53.2	280 26	N. 0 23	0.3375
18	17 22.1	23 11	0.4103	3 33.8	283 35	S. 0 1	0.3385
28	17 42.9	23 44	0.4267	3 15.1	286 44	0 25	0.3396
Nov. 7	18 4.2	24 5	0.4416	2 57.1	289 51	0 48	0.3409
17	18 26.0	24 14	0.4550	2 39.5	292 58	1 11	0.3422
27	18 48.1	24 11	0.4671	2 22.2	296 3	1 34	0.3436
Dec. 7	19 10.3	23 54	0.4777	2 5.0	299 7	1 56	0.3450
17	19 32.7	23 26	0.4868	1 47.9	302 10	2 18	0.3466
27	19 54.9	22 46	0.4946	1 30.7	305 12	2 39	0.3481
37	20 16.9	S. 21 55	0.5009	1 13.4	308 12	S. 3 0	0.3498



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>s</i>	<i>South.</i> <i>° ' "</i>	<i>South.</i> <i>° ' "</i>	<i>+</i> <i>"</i>	<i>"</i>
Apr. 4	15 55 30.17	15 55 24.10	0.22	9 47 56.4	9 45 30.3	6.1	6.6
6	15 55 16.02	15 55 5.93	0.38	9 43 1.7	9 40 30.9	6.2	6.7
8	15 54 53.85	15 54 39.78	0.54	9 37 58.2	9 35 23.8	6.4	6.8
10	15 54 23.72	15 54 5.69	0.71	9 32 47.9	9 30 10.6	6.5	6.9
12	15 53 45.70	15 53 23.76	0.87	9 27 32.3	9 24 53.3	6.6	7.0
14	15 52 59.90	15 52 34.15	1.03	9 22 13.6	9 19 33.7	6.7	7.1
16	15 52 6.53	15 51 37.07	1.19	9 16 53.7	9 14 14.0	6.7	7.1
18	15 51 5.81	15 50 32.77	1.34	9 11 34.7	9 8 56.3	6.6	7.2
20	15 49 58.02	15 49 21.56	1.48	9 6 18.9	9 3 42.8	6.5	7.3
22	15 48 43.46	15 48 3.74	1.62	9 1 8.4	8 58 35.8	6.4	7.3
24	15 47 22.46	15 46 39.66	1.75	8 56 5.3	8 53 37.2	6.2	7.4
26	15 45 55.40	15 45 9.71	1.87	8 51 11.9	8 48 49.5	6.0	7.5
28	15 44 22.67	15 43 34.31	1.99	8 46 30.3	8 44 14.6	5.7	7.5
30	15 42 44.70	15 41 53.91	2.09	8 42 2.7	8 39 54.8	5.4	7.5
May 2	15 41 1.99	15 40 9.02	2.19	8 37 51.3	8 35 52.3	5.1	7.6
4	15 39 15.08	15 38 20.23	2.27	8 33 58.3	8 32 9.6	4.6	7.6
6	15 37 24.57	15 36 28.17	2.33	8 30 26.3	8 28 48.9	4.2	7.7
8	15 35 31.11	15 34 33.49	2.39	8 27 17.5	8 25 52.5	3.7	7.7
10	15 33 35.39	15 32 36.87	2.43	8 24 34.1	8 23 22.5	3.1	7.7
12	15 31 38.05	15 30 39.00	2.46	8 22 18.1	8 21 21.2	2.5	7.7
14	15 29 39.81	15 28 40.58	2.47	8 20 31.8	8 19 50.2	1.9	7.7
16	15 27 41.41	15 26 42.38	2.46	8 19 16.8	8 18 51.6	1.2	7.7
18	15 25 43.58	15 24 45.10	2.44	8 18 34.9	8 18 26.9	0.5	7.7
20	15 23 47.05	15 22 49.49	2.41	8 18 27.7	8 18 37.6	0.2	7.7
22	15 21 52.49	15 20 56.11	2.36	8 18 56.4	8 19 24.5	1.0	7.7
24	15 20 0.44	15 19 5.55	2.30	8 20 1.7	8 20 48.4	1.8	7.6
26	15 18 11.49	15 17 18.35	2.23	8 21 44.3	8 22 49.8	2.5	7.6
28	15 16 26.20	15 15 35.11	2.15	8 24 4.8	8 25 29.4	3.3	7.6
30	15 14 45.13	15 13 56.34	2.06	8 27 3.6	8 28 47.6	4.1	7.6
June 1	15 13 8.80	15 12 22.57	1.95	8 30 41.2	8 32 44.5	4.9	7.5
3	15 11 37.70	15 10 54.24	1.84	8 34 57.5	8 37 20.2	5.7	7.5
5	15 10 12.24	15 9 31.75	1.72	8 39 52.5	8 42 34.5	6.5	7.4
7	15 8 52.82	15 8 15.50	1.59	8 45 26.0	8 48 27.1	7.3	7.4
9	15 7 39.82	15 7 5.83	1.45	8 51 37.6	8 54 57.6	8.1	7.3
11	15 6 33.55	15 6 3.04	1.31	8 58 27.0	9 2 5.6	8.9	7.3
13	15 5 34.32	15 5 7.41	1.16	9 5 53.5	9 9 50.4	9.7	7.2
15	15 4 42.32	15 4 19.08	1.01	9 13 56.2	9 18 10.8	10.4	7.1
17	15 3 57.70	15 3 38.20	0.85	9 22 34.1	9 27 5.9	11.1	7.0
19	15 3 20.58	15 3 4.85	0.69	9 31 46.0	9 36 34.3	11.8	6.9
21	15 2 51.01	15 2 39.06	0.54	9 41 30.6	9 46 34.8	12.5	6.9
23	15 2 29.01	15 2 20.85	0.38	9 51 46.7	9 57 6.1	13.2	6.8
25	15 2 14.57	15 2 10.19	0.22	10 2 32.8	10 8 6.7	13.8	6.7



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
June 27	<sup>h</sup> <sup>m</sup> <sup>s</sup> 15 2 7.69	<sup>h</sup> <sup>m</sup> <sup>s</sup> 15 2 7.08	— 0.06 +	<i>South.</i> 10 13 47.6	<i>South.</i> 10 19 35.3	— 14.3	6.6
29	15 2 8.34	15 2 11.48	0.09	10 25 29.7	10 31 30.6	14.9	6.5
July 1	15 2 16.47	15 2 23.32	0.25	10 37 37.8	10 43 51.2	15.4	6.5
3	15 2 32.03	15 2 42.57	0.40	10 50 10.6	10 56 35.9	15.9	6.4
5	15 2 54.95	15 3 9.16	0.55	11 3 6.8	11 9 43.2	16.4	6.3
7	15 3 25.17	15 3 42.99	0.70	11 16 25.0	11 23 12.0	16.8	6.2
9	15 4 2.59	15 4 23.96	0.85	11 30 4.0	11 37 0.9	17.3	6.1
11	15 4 47.09	15 5 11.97	1.00	11 44 2.5	11 51 8.6	17.7	6.0
13	15 5 38.57	15 6 6.89	1.14	11 58 19.2	12 5 33.8	18.0	6.0
15	15 6 36.89	15 7 8.56	1.28	12 12 52.5	12 20 15.0	18.4	5.9
17	15 7 41.87	15 8 16.81	1.42	12 27 41.1	12 35 10.7	18.7	5.8
19	15 8 53.35	15 9 31.47	1.56	12 42 43.5	12 50 19.4	18.9	5.7
21	15 10 11.15	15 10 52.37	1.69	12 57 58.3	13 5 39.9	19.2	5.6
23	15 11 35.11	15 12 19.36	1.81	13 13 24.1	13 21 10.8	19.4	5.6
25	15 13 5.07	15 13 52.25	1.94	13 28 59.7	13 36 50.8	19.6	5.5
27	15 14 40.88	15 15 30.93	2.06	13 44 43.8	13 52 38.7	19.7	5.5
29	15 16 22.40	15 17 15.27	2.17	14 0 35.3	14 8 33.4	19.9	5.4
31	15 18 9.51	15 19 5.12	2.29	14 16 32.9	14 24 33.8	20.0	5.3
Aug. 2	15 20 2.08	15 21 0.38	2.40	14 32 35.7	14 40 38.7	20.1	5.2
4	15 22 0.00	15 23 0.93	2.51	14 48 42.6	14 56 47.2	20.2	5.2
6	15 24 3.15	15 25 6.64	2.62	15 4 52.5	15 12 58.3	20.2	5.1
8	15 26 11.40	15 27 17.39	2.72	15 21 4.4	15 29 10.7	20.3	5.0
10	15 28 24.62	15 29 33.05	2.83	15 37 17.2	15 45 23.5	20.3	5.0
12	15 30 42.67	15 31 53.47	2.93	15 53 29.8	16 1 35.6	20.3	4.9
14	15 33 5.42		3.03	16 9 41.1		20.2	4.8



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 20 5 <sup>9</sup>	S. 22 21	0 <sup>4</sup> 979	h m 1 22 <sup>0</sup>	° ' / 306 42	S. ° ' / 2 50	0 <sup>0</sup> 3489
11	20 27 <sup>8</sup>	21 25	0 <sup>5</sup> 036	1 4 <sup>6</sup>	309 42	3 10	0 <sup>0</sup> 3506
21	20 49 <sup>4</sup>	20 19	0 <sup>5</sup> 079	0 46 <sup>8</sup>	312 41	3 30	0 <sup>0</sup> 3523
31	21 10 <sup>6</sup>	19 4	0 <sup>5</sup> 108	0 28 <sup>6</sup>	315 38	3 49	0 <sup>0</sup> 3540
Feb. 10	21 31 <sup>4</sup>	17 42	0 <sup>5</sup> 123	10 10 <sup>0</sup>	318 34	4 7	0 <sup>0</sup> 3558
20	21 51 <sup>8</sup>	16 15	0 <sup>5</sup> 125	23 49 <sup>0</sup>	321 29	4 24	0 <sup>0</sup> 3576
Mar. 2	22 11 <sup>7</sup>	14 42	0 <sup>5</sup> 113	23 29 <sup>4</sup>	324 22	4 41	0 <sup>0</sup> 3594
12	22 31 <sup>1</sup>	13 7	0 <sup>5</sup> 087	23 9 <sup>4</sup>	327 14	4 57	0 <sup>0</sup> 3613
22	22 50 <sup>1</sup>	11 29	0 <sup>5</sup> 048	22 48 <sup>9</sup>	330 5	5 12	0 <sup>0</sup> 3631
Apr. 1	23 8 <sup>6</sup>	9 50	0 <sup>4</sup> 994	22 28 <sup>0</sup>	332 54	5 26	0 <sup>0</sup> 3650
11	23 26 <sup>6</sup>	8 13	0 <sup>4</sup> 926	22 6 <sup>6</sup>	335 42	5 39	0 <sup>0</sup> 3669
21	23 44 <sup>1</sup>	6 37	0 <sup>4</sup> 845	21 44 <sup>7</sup>	338 29	5 51	0 <sup>0</sup> 3687
May 1	0 1 <sup>2</sup>	5 3	0 <sup>4</sup> 749	21 22 <sup>3</sup>	341 15	6 2	0 <sup>0</sup> 3706
11	0 17 <sup>7</sup>	3 34	0 <sup>4</sup> 638	20 59 <sup>4</sup>	343 59	6 13	0 <sup>0</sup> 3725
21	0 33 <sup>7</sup>	2 10	0 <sup>4</sup> 512	20 36 <sup>0</sup>	346 42	6 23	0 <sup>0</sup> 3743
31	0 49 <sup>1</sup>	S. 0 53	0 <sup>4</sup> 370	20 12 <sup>0</sup>	349 24	6 31	0 <sup>0</sup> 3761
June 10	1 3 <sup>8</sup>	N. 0 17	0 <sup>4</sup> 213	19 47 <sup>2</sup>	352 4	6 39	0 <sup>0</sup> 3779
20	1 17 <sup>8</sup>	1 19	0 <sup>4</sup> 040	19 21 <sup>7</sup>	354 43	6 45	0 <sup>0</sup> 3796
30	1 30 <sup>8</sup>	2 12	0 <sup>3</sup> 851	18 55 <sup>2</sup>	357 21	6 51	0 <sup>0</sup> 3814
July 10	1 42 <sup>7</sup>	2 53	0 <sup>3</sup> 647	18 27 <sup>7</sup>	359 58	6 56	0 <sup>0</sup> 3831
20	1 53 <sup>3</sup>	3 23	0 <sup>3</sup> 429	17 58 <sup>8</sup>	2 33	7 0	0 <sup>0</sup> 3848
30	2 2 <sup>3</sup>	3 41	0 <sup>3</sup> 199	17 28 <sup>3</sup>	5 8	7 3	0 <sup>0</sup> 3864
Aug. 9	2 9 <sup>5</sup>	3 45	0 <sup>2</sup> 959	16 56 <sup>0</sup>	7 41	7 6	0 <sup>0</sup> 3880
19	2 14 <sup>4</sup>	3 35	0 <sup>2</sup> 716	16 21 <sup>5</sup>	10 13	7 7	0 <sup>0</sup> 3896
29	2 16 <sup>9</sup>	3 11	0 <sup>2</sup> 477	15 44 <sup>5</sup>	12 44	7 8	0 <sup>0</sup> 3911
Sept. 8	2 16 <sup>7</sup>	2 33	0 <sup>2</sup> 252	15 4 <sup>7</sup>	15 14	7 8	0 <sup>0</sup> 3925
18	2 13 <sup>6</sup>	1 44	0 <sup>2</sup> 057	14 22 <sup>1</sup>	17 44	7 7	0 <sup>0</sup> 3939
28	2 7 <sup>7</sup>	N. 0 49	0 <sup>1</sup> 908	13 36 <sup>8</sup>	20 12	7 5	0 <sup>0</sup> 3953
Oct. 8	1 59 <sup>6</sup>	S. 0 9	0 <sup>1</sup> 821	12 49 <sup>4</sup>	22 39	7 2	0 <sup>0</sup> 3966
18	1 50 <sup>2</sup>	1 2	0 <sup>1</sup> 808	12 0 <sup>7</sup>	25 5	6 59	0 <sup>0</sup> 3979
28	1 40 <sup>6</sup>	1 42	0 <sup>1</sup> 872	11 11 <sup>8</sup>	27 31	6 55	0 <sup>0</sup> 3991
Nov. 7	1 31 <sup>9</sup>	2 5	0 <sup>2</sup> 009	10 23 <sup>9</sup>	29 56	6 50	0 <sup>0</sup> 4002
17	1 25 <sup>1</sup>	2 7	0 <sup>2</sup> 205	9 38 <sup>0</sup>	32 20	6 45	0 <sup>0</sup> 4013
27	1 20 <sup>8</sup>	1 49	0 <sup>2</sup> 444	8 54 <sup>5</sup>	34 43	6 39	0 <sup>0</sup> 4023
Dec. 7	1 19 <sup>2</sup>	1 14	0 <sup>2</sup> 709	8 13 <sup>7</sup>	37 5	6 32	0 <sup>0</sup> 4033
17	1 20 <sup>3</sup>	S. 0 22	0 <sup>2</sup> 985	7 35 <sup>5</sup>	39 27	6 25	0 <sup>0</sup> 4042
27	1 23 <sup>9</sup>	N. 0 41	0 <sup>3</sup> 262	6 59 <sup>8</sup>	41 48	6 17	0 <sup>0</sup> 4051
37	1 29 <sup>5</sup>	N. 1 55	0 <sup>3</sup> 531	6 26 <sup>1</sup>	44 9	S. 6 8	0 <sup>0</sup> 4058



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
				<i>North.</i>	<i>North.</i>		
Sept. 8	<sup>h</sup> <sup>m</sup> <sup>s</sup> 2 16 33.43	<sup>h</sup> <sup>m</sup> <sup>s</sup> 2 16 21.39	0.47	2 30 40.1	2 26 13.0	11.0	5.3
10	2 16 7.64	2 15 52.19	0.61	2 21 39.3	2 16 59.4	11.5	5.3
12	2 15 35.02	2 15 16.15	0.75	2 12 13.4	2 7 21.4	12.0	5.4
14	2 14 55.58	2 14 33.32	0.89	2 2 23.7	1 57 20.6	12.5	5.5
16	2 14 9.38	2 13 43.77	1.03	1 52 12.2	1 46 58.8	13.0	5.5
18	2 13 16.49	2 12 47.58	1.17	1 41 40.6	1 36 18.0	13.4	5.6
20	2 12 17.05	2 11 44.92	1.31	1 30 51.2	1 25 20.6	13.7	5.6
22	2 11 11.22	2 10 35.99	1.44	1 19 46.5	1 14 9.3	14.0	5.7
24	2 9 59.23	2 9 21.00	1.56	1 8 29.2	1 2 46.7	14.2	5.7
26	2 8 41.33	2 8 0.26	1.68	0 57 2.1	0 51 15.9	14.4	5.8
28	2 7 17.84	2 6 34.10	1.80	0 45 28.5	0 39 40.3	14.5	5.8
30	2 5 49.09	2 5 2.86	1.90	0 33 51.7	0 28 3.1	14.5	5.8
Oct. 2	2 4 15.47	2 3 26.97	2.00	0 22 14.9	0 16 27.7	14.5	5.8
4	2 2 37.40	2 1 46.83	2.09	0 10 41.7	0 4 57.4	14.4	5.9
				<i>South.</i>	<i>South.</i>		
6	2 0 55.33	2 0 2.93	2.16	0 0 44.7	0 6 24.3	14.2	5.9
8	1 59 9.71	1 58 15.70	2.23	0 12 0.9	0 17 34.1	14.0	5.9
10	1 57 20.98	1 56 25.60	2.29	0 23 3.5	0 28 28.6	13.6	5.9
12	1 55 29.63	1 54 33.12	2.34	0 33 49.1	0 39 4.4	13.2	5.9
14	1 53 36.17	1 52 38.82	2.38	0 44 14.3	0 49 18.4	12.8	5.9
16	1 51 41.16	1 50 43.24	2.41	0 54 16.1	0 59 7.1	12.3	5.9
18	1 49 45.15	1 48 46.96	2.42	1 3 51.0	1 8 27.3	11.7	5.9
20	1 47 48.73	1 46 50.55	2.43	1 12 55.8	1 17 16.0	11.0	5.9
22	1 45 52.47	1 44 54.58	2.42	1 21 27.5	1 25 30.0	10.3	5.9
24	1 43 56.96	1 42 59.68	2.39	1 29 23.1	1 33 6.6	9.5	5.9
26	1 42 2.81	1 41 6.42	2.36	1 36 40.1	1 40 3.3	8.7	5.8
28	1 40 10.57	1 39 15.34	2.31	1 43 15.9	1 46 17.7	7.8	5.8
30	1 38 20.81	1 37 27.04	2.26	1 49 8.4	1 51 47.9	6.9	5.8
Nov. 1	1 36 34.06	1 35 41.94	2.19	1 54 16.0	1 56 32.5	5.9	5.7
3	1 34 50.74	1 34 0.51	2.11	1 58 37.4	2 0 30.4	5.0	5.7
5	1 33 11.29	1 32 23.14	2.03	2 2 11.6	2 3 40.8	4.0	5.7
7	1 31 36.10	1 30 50.22	1.94	2 4 57.9	2 6 2.9	3.0	5.6
9	1 30 5.54	1 29 22.10	1.84	2 6 55.7	2 7 36.4	1.9	5.6
11	1 28 39.95	1 27 59.10	1.73	2 8 4.8	2 8 21.1	0.9	5.5
						+	
13	1 27 19.60	1 26 41.49	1.62	2 8 25.1	2 8 17.0	0.1	5.5
15	1 26 4.78	1 25 29.52	1.50	2 7 56.6	2 7 24.2	1.1	5.4
17	1 24 55.72	1 24 23.42	1.38	2 6 39.7	2 5 43.2	2.1	5.4
19	1 23 52.64	1 23 23.40	1.25	2 4 34.8	2 3 14.5	3.1	5.3
21	1 22 55.72	1 22 29.62	1.12	2 1 42.3	1 59 58.5	4.1	5.3
23	1 22 5.12	1 21 42.22	0.99	1 58 3.1	1 55 56.2	5.0	5.2
25	1 21 20.94	1 21 1.29	0.85	1 53 37.9	1 51 8.4	6.0	5.2
27	1 20 43.28	1 20 26.89	0.72	1 48 27.8	1 45 36.3	6.9	5.1



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>—</i>	<i>South.</i>	<i>South.</i>	<i>+</i>	
Nov. 29	1 20 12.16	1 19 59.06	0.58	1 42 34.0	1 39 21.2	7.8	5.1
Dec. 1	1 19 47.60	1 19 37.77	0.44	1 35 57.9	1 32 24.4	8.7	5.0
3	1 19 29.57	1 19 22.98	0.31	1 28 40.9	1 24 47.5	9.5	4.9
5	1 19 18.00	1 19 14.63	0.17	1 20 44.6	1 16 32.2	10.3	4.8
7	1 19 12.84	1 19 12.64	0.04	1 12 10.5	1 7 39.7	11.1	4.8
			+				
9	1 19 14.01	1 19 16.95	0.09	1 2 59.9	0 58 11.4	11.8	4.7
11	1 19 21.43	1 19 27.44	0.22	0 53 14.4	0 48 9.0	12.6	4.6
13	1 19 34.99	1 19 44.05	0.35	0 42 55.3	0 37 33.6	13.2	4.6
15	1 19 54.62	1 20 6.68	0.47	0 32 4.0	0 26 26.6	13.9	4.5
17	1 20 20.21	1 20 35.22	0.59	0 20 41.7	0 14 49.3	14.5	4.5
19	1 20 51.68	1 21 9.58	0.72	0 8 49.7	0 2 43.0	15.1	4.5
				<i>North.</i>	<i>North.</i>		
21	1 21 28.91	1 21 49.64	0.83	0 3 30.6	0 9 51.0	15.7	4.4
23	1 22 11.77	1 22 35.27	0.95	0 16 18.0	0 22 51.4	16.3	4.3
25	1 23 0.13	1 23 26.34	1.06	0 29 31.1	0 36 16.8	16.8	4.3
27	1 23 53.87	1 24 22.71	1.17	0 43 8.6	0 50 6.0	17.3	4.2
29	1 24 52.83	1 25 24.22	1.28	0 57 9.1	1 4 17.6	17.7	4.2
31	1 25 56.85	1 26 30.71	1.39	1 11 31.4	1 18 50.2	18.2	4.1



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Veet.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 8 31.6	N. 14 31	0.0749	h m 13 46.3	° 114 52	S. 2 23	0.3254
11	8 24.7	15 20	0.0577	13 0.0	118 20	2 6	0.3240
21	8 16.0	16 20	0.0494	12 12.0	121 50	1 47	0.3229
31	8 7.1	17 25	0.0508	11 23.9	125 20	1 29	0.3221
Feb. 10	7 59.4	18 28	0.0618	10 37.0	128 52	1 10	0.3215
20	7 54.3	19 22	0.0806	9 52.7	132 23	0 50	0.3211
Mar. 2	7 52.5	20 5	0.1052	9 11.8	135 55	0 31	0.3211
12	7 54.2	20 34	0.1333	8 34.3	139 27	S. 0 11	0.3213
22	7 59.5	20 49	0.1630	8 0.3	142 58	N. 0 9	0.3217
Apr. 1	8 7.7	20 52	0.1932	7 29.2	146 29	0 28	0.3224
11	8 18.4	20 41	0.2229	7 0.7	149 59	0 47	0.3234
21	8 31.2	20 17	0.2516	6 34.1	153 28	1 7	0.3246
May 1	8 45.5	19 41	0.2789	6 9.1	156 55	1 25	0.3260
11	9 1.1	18 52	0.3048	5 45.4	160 22	1 44	0.3277
21	9 17.7	17 53	0.3292	5 22.5	163 46	2 2	0.3296
31	9 34.9	16 44	0.3520	5 0.3	167 9	2 19	0.3317
June 10	9 52.5	15 25	0.3733	4 38.6	170 30	2 35	0.3340
20	10 10.5	13 58	0.3931	4 17.2	173 49	2 51	0.3365
30	10 28.7	12 23	0.4115	3 56.0	177 6	3 6	0.3391
July 10	10 47.0	10 42	0.4285	3 34.9	180 20	3 21	0.3419
20	11 5.3	8 56	0.4442	3 13.9	183 32	3 34	0.3449
30	11 23.7	7 6	0.4585	2 52.8	186 41	3 47	0.3479
Aug. 9	11 42.1	5 13	0.4715	2 31.8	189 47	3 59	0.3511
19	12 0.5	3 19	0.4833	2 10.9	192 51	4 10	0.3544
29	12 18.9	N. 1 24	0.4938	1 49.9	195 52	4 20	0.3578
Sept. 8	12 37.3	S. 0 31	0.5030	1 28.9	198 51	4 29	0.3612
18	12 55.8	2 23	0.5109	1 8.0	201 47	4 37	0.3647
28	13 14.3	4 14	0.5175	0 47.1	204 39	4 45	0.3683
Oct. 8	13 32.8	6 1	0.5228	0 26.2	207 30	4 52	0.3718
18	13 51.4	7 44	0.5268	0 5.4	210 17	4 58	0.3754
28	14 10.0	9 20	0.5294	23 42.5	213 2	5 3	0.3791
Nov. 7	14 28.6	10 50	0.5306	23 21.7	215 44	5 7	0.3827
17	14 47.1	12 14	0.5303	23 0.9	218 23	5 11	0.3863
27	15 5.6	13 30	0.5286	22 40.0	221 0	5 14	0.3899
Dec. 7	15 24.0	14 37	0.5253	22 19.0	223 34	5 16	0.3935
17	15 42.2	15 36	0.5205	21 57.7	226 6	5 18	0.3971
27	16 0.1	16 25	0.5141	21 36.1	228 35	5 19	0.4007
37	16 17.5	S. 17 6	0.5061	21 14.1	231 2	N. 5 19	0.4042



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
			—	North.	North.	+	
Jan. 1	8 <sup>h</sup> 31 <sup>m</sup> 16 <sup>s</sup> .03	8 <sup>h</sup> 30 <sup>m</sup> 40 <sup>s</sup> .57	1 <sup>.44</sup>	14 33 19.4	14 37 32.8	10 <sup>.4</sup>	7 <sup>.5</sup>
3	8 30 3 <sup>.49</sup>	8 29 24 <sup>.84</sup>	1 <sup>.58</sup>	14 41 56.1	14 46 29.2	11 <sup>.2</sup>	7 <sup>.6</sup>
5	8 28 44 <sup>.68</sup>	8 28 3 <sup>.06</sup>	1 <sup>.70</sup>	14 51 11.6	14 56 3 <sup>.1</sup>	12 <sup>.0</sup>	7 <sup>.6</sup>
7	8 27 20 <sup>.05</sup>	8 26 35 <sup>.73</sup>	1 <sup>.82</sup>	15 1 3 <sup>.5</sup>	15 6 12 <sup>.4</sup>	12 <sup>.7</sup>	7 <sup>.7</sup>
9	8 25 50 <sup>.16</sup>	8 25 3 <sup>.42</sup>	1 <sup>.92</sup>	15 11 29.5	15 16 54 <sup>.3</sup>	13 <sup>.4</sup>	7 <sup>.8</sup>
11	8 24 15 <sup>.59</sup>	8 23 26 <sup>.74</sup>	2 <sup>.01</sup>	15 22 26.5	15 28 5 <sup>.8</sup>	14 <sup>.0</sup>	7 <sup>.8</sup>
13	8 22 36 <sup>.97</sup>	8 21 46 <sup>.36</sup>	2 <sup>.09</sup>	15 33 51.6	15 39 43 <sup>.6</sup>	14 <sup>.5</sup>	7 <sup>.9</sup>
15	8 20 54 <sup>.99</sup>	8 20 2 <sup>.93</sup>	2 <sup>.15</sup>	15 45 41.5	15 51 44 <sup>.6</sup>	15 <sup>.0</sup>	7 <sup>.9</sup>
17	8 19 10 <sup>.28</sup>	8 18 17 <sup>.13</sup>	2 <sup>.20</sup>	15 57 52 <sup>.7</sup>	16 4 5 <sup>.4</sup>	15 <sup>.4</sup>	7 <sup>.9</sup>
19	8 17 23 <sup>.57</sup>	8 16 29 <sup>.67</sup>	2 <sup>.24</sup>	16 10 22 <sup>.0</sup>	16 16 42 <sup>.3</sup>	15 <sup>.7</sup>	7 <sup>.9</sup>
21	8 15 35 <sup>.53</sup>	8 14 41 <sup>.27</sup>	2 <sup>.26</sup>	16 23 5 <sup>.6</sup>	16 29 31 <sup>.7</sup>	16 <sup>.0</sup>	7 <sup>.9</sup>
23	8 13 46 <sup>.94</sup>	8 12 52 <sup>.65</sup>	2 <sup>.26</sup>	16 36 0 <sup>.1</sup>	16 42 30 <sup>.2</sup>	16 <sup>.2</sup>	7 <sup>.9</sup>
25	8 11 58 <sup>.48</sup>	8 11 4 <sup>.55</sup>	2 <sup>.25</sup>	16 49 1 <sup>.7</sup>	16 55 34 <sup>.0</sup>	16 <sup>.3</sup>	7 <sup>.9</sup>
27	8 10 10 <sup>.95</sup>	8 9 17 <sup>.78</sup>	2 <sup>.22</sup>	17 2 6 <sup>.7</sup>	17 8 39 <sup>.4</sup>	16 <sup>.4</sup>	7 <sup>.9</sup>
29	8 8 25 <sup>.12</sup>	8 7 33 <sup>.08</sup>	2 <sup>.18</sup>	17 15 11 <sup>.6</sup>	17 21 42 <sup>.8</sup>	16 <sup>.3</sup>	7 <sup>.9</sup>
31	8 6 41 <sup>.76</sup>	8 5 51 <sup>.24</sup>	2 <sup>.12</sup>	17 28 12 <sup>.5</sup>	17 34 40 <sup>.3</sup>	16 <sup>.2</sup>	7 <sup>.9</sup>
Feb. 2	8 5 1 <sup>.62</sup>	8 4 13 <sup>.00</sup>	2 <sup>.05</sup>	17 41 5 <sup>.9</sup>	17 47 28 <sup>.9</sup>	16 <sup>.0</sup>	7 <sup>.9</sup>
4	8 3 25 <sup>.44</sup>	8 2 39 <sup>.05</sup>	1 <sup>.96</sup>	17 53 48 <sup>.9</sup>	18 0 5 <sup>.5</sup>	15 <sup>.8</sup>	7 <sup>.9</sup>
6	8 1 53 <sup>.91</sup>	8 1 10 <sup>.10</sup>	1 <sup>.85</sup>	18 6 18 <sup>.3</sup>	18 12 27 <sup>.0</sup>	15 <sup>.5</sup>	7 <sup>.8</sup>
8	8 0 27 <sup>.69</sup>	7 59 46 <sup>.75</sup>	1 <sup>.74</sup>	18 18 31 <sup>.2</sup>	18 24 30 <sup>.7</sup>	15 <sup>.1</sup>	7 <sup>.8</sup>
10	7 59 7 <sup>.35</sup>	7 58 29 <sup>.55</sup>	1 <sup>.61</sup>	18 30 25 <sup>.2</sup>	18 36 14 <sup>.4</sup>	14 <sup>.7</sup>	7 <sup>.7</sup>
12	7 57 53 <sup>.44</sup>	7 57 19 <sup>.05</sup>	1 <sup>.47</sup>	18 41 58 <sup>.0</sup>	18 47 35 <sup>.8</sup>	14 <sup>.2</sup>	7 <sup>.7</sup>
14	7 56 46 <sup>.43</sup>	7 56 15 <sup>.62</sup>	1 <sup>.32</sup>	18 53 7 <sup>.6</sup>	18 58 33 <sup>.2</sup>	13 <sup>.7</sup>	7 <sup>.6</sup>
16	7 55 46 <sup>.67</sup>	7 55 19 <sup>.62</sup>	1 <sup>.16</sup>	19 3 52 <sup>.4</sup>	19 9 5 <sup>.0</sup>	13 <sup>.2</sup>	7 <sup>.6</sup>
18	7 54 54 <sup>.49</sup>	7 54 31 <sup>.33</sup>	1 <sup>.01</sup>	19 14 11 <sup>.0</sup>	19 19 10 <sup>.1</sup>	12 <sup>.6</sup>	7 <sup>.5</sup>
20	7 54 10 <sup>.16</sup>	7 53 51 <sup>.01</sup>	0 <sup>.84</sup>	19 24 2 <sup>.3</sup>	19 28 47 <sup>.3</sup>	12 <sup>.0</sup>	7 <sup>.4</sup>
22	7 53 33 <sup>.89</sup>	7 53 18 <sup>.83</sup>	0 <sup>.67</sup>	19 33 25 <sup>.0</sup>	19 37 55 <sup>.3</sup>	11 <sup>.4</sup>	7 <sup>.4</sup>
24	7 53 5 <sup>.85</sup>	7 52 54 <sup>.95</sup>	0 <sup>.50</sup>	19 42 18 <sup>.2</sup>	19 46 33 <sup>.5</sup>	10 <sup>.8</sup>	7 <sup>.3</sup>
26	7 52 46 <sup>.17</sup>	7 52 39 <sup>.50</sup>	0 <sup>.32</sup>	19 50 41 <sup>.1</sup>	19 54 41 <sup>.0</sup>	10 <sup>.1</sup>	7 <sup>.2</sup>
28	7 52 34 <sup>.97</sup>	7 52 32 <sup>.58</sup>	0 <sup>.14</sup>	19 58 33 <sup>.1</sup>	20 2 17 <sup>.3</sup>	9 <sup>.5</sup>	7 <sup>.1</sup>
Mar. 2	7 52 32 <sup>.33</sup>	7 52 34 <sup>.23</sup>	0 <sup>.03</sup>	20 5 53 <sup>.6</sup>	20 9 21 <sup>.9</sup>	8 <sup>.8</sup>	7 <sup>.1</sup>
4	7 52 38 <sup>.28</sup>	7 52 44 <sup>.47</sup>	0 <sup>.21</sup>	20 12 42 <sup>.1</sup>	20 15 54 <sup>.4</sup>	8 <sup>.2</sup>	7 <sup>.0</sup>
6	7 52 52 <sup>.81</sup>	7 53 3 <sup>.28</sup>	0 <sup>.39</sup>	20 18 58 <sup>.5</sup>	20 21 54 <sup>.4</sup>	7 <sup>.5</sup>	6 <sup>.9</sup>
8	7 53 15 <sup>.89</sup>	7 53 30 <sup>.61</sup>	0 <sup>.57</sup>	20 24 42 <sup>.3</sup>	20 27 22 <sup>.0</sup>	6 <sup>.8</sup>	6 <sup>.8</sup>
10	7 53 47 <sup>.42</sup>	7 54 6 <sup>.31</sup>	0 <sup>.74</sup>	20 29 53 <sup>.6</sup>	20 32 17 <sup>.0</sup>	6 <sup>.1</sup>	6 <sup>.7</sup>
12	7 54 27 <sup>.27</sup>	7 54 50 <sup>.27</sup>	0 <sup>.92</sup>	20 34 32 <sup>.2</sup>	20 36 39 <sup>.3</sup>	5 <sup>.5</sup>	6 <sup>.6</sup>
14	7 55 15 <sup>.28</sup>	7 55 42 <sup>.28</sup>	1 <sup>.08</sup>	20 38 38 <sup>.3</sup>	20 40 29 <sup>.1</sup>	4 <sup>.8</sup>	6 <sup>.5</sup>
16	7 56 11 <sup>.26</sup>	7 56 42 <sup>.17</sup>	1 <sup>.25</sup>	20 42 11 <sup>.8</sup>	20 43 46 <sup>.4</sup>	4 <sup>.1</sup>	6 <sup>.4</sup>
18	7 57 15 <sup>.00</sup>	7 57 49 <sup>.73</sup>	1 <sup>.41</sup>	20 45 13 <sup>.0</sup>	20 46 31 <sup>.4</sup>	3 <sup>.4</sup>	6 <sup>.3</sup>
20	7 58 26 <sup>.31</sup>	7 59 4 <sup>.71</sup>	1 <sup>.56</sup>	20 47 41 <sup>.9</sup>	20 48 44 <sup>.3</sup>	2 <sup>.8</sup>	6 <sup>.2</sup>
22	7 59 44 <sup>.91</sup>	8 0 26 <sup>.89</sup>	1 <sup>.71</sup>	20 49 38 <sup>.7</sup>	20 50 25 <sup>.2</sup>	2 <sup>.1</sup>	6 <sup>.1</sup>
24	8 1 10 <sup>.61</sup>	8 1 56 <sup>.04</sup>	1 <sup>.86</sup>	20 51 3 <sup>.5</sup>	20 51 33 <sup>.9</sup>	1 <sup>.4</sup>	6 <sup>.0</sup>



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>
Mar. 26	8 2 43.15	8 3 31.92	2.00	20 51 56.3	20 52 10.8	0.8	6.0
28	8 4 22.31	8 5 14.33	2.13	20 52 17.4	20 52 16.0	0.1	5.9
30	8 6 7.92	8 7 3.08	2.26	20 52 6.6	20 51 49.3	0.6	5.8
Apr. 1	8 7 59.77	8 8 57.08	2.39	20 51 24.1	20 50 51.0	1.2	5.7
3	8 9 57.67	8 10 58.81	2.52	20 50 10.0	20 49 21.1	1.9	5.6
5	8 12 1.39	8 13 5.36	2.64	20 48 24.5	20 47 19.9	2.5	5.5
7	8 14 10.70	8 15 17.39	2.75	20 46 7.5	20 44 47.4	3.2	5.5
9	8 16 25.39	8 17 34.67	2.86	20 43 19.4	20 41 43.8	3.8	5.4
11	8 18 45.20	8 19 56.94	2.96	20 40 0.5	20 38 9.5	4.5	5.3
13	8 21 9.87	8 22 23.96	3.06	20 36 10.9	20 34 4.8	5.1	5.3
15	8 23 39.16	8 24 55.47	3.16	20 31 51.1	20 29 29.8	5.7	5.2
17	8 26 12.84	8 27 31.25	3.25	20 27 1.1	20 24 24.9	6.4	5.2
19	8 28 50.66	8 30 11.06	3.33	20 21 41.3	20 18 50.3	7.0	5.1
21	8 31 32.43	8 32 54.74	3.41	20 15 51.9	20 12 46.1	7.6	5.0
23	8 34 17.96	8 35 42.09	3.49	20 9 33.0	20 6 12.5	8.2	4.9
25	8 37 7.09	8 38 32.95	3.56	20 2 44.8	19 59 9.7	8.8	4.9
27	8 39 59.65	8 41 27.18	3.63	19 55 27.4	19 51 37.9	9.4	4.8
29	8 42 55.51	8 44 24.63	3.70	19 47 41.2	19 43 37.3	10.0	4.8
May 1	8 45 54.51	8 47 25.13	3.76	19 39 26.2	19 35 8.1	10.6	4.7
3	8 48 56.48	8 50 28.54	3.82	19 30 42.9	19 26 10.6	11.2	4.6
5	8 52 1.29	8 53 34.71	3.88	19 21 31.3	19 16 45.0	11.8	4.6



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	<sup>h</sup> 16 <sup>m</sup> 8 <sup>s</sup> 9	S. 16° 47'	0 <sup>.</sup> 5103	<sup>h</sup> 21 <sup>m</sup> 25 <sup>s</sup> 2	<sup>o</sup> 229 49	N. 5° 19'	0 <sup>.</sup> 4024
11	16 26 1	17 23	0 <sup>.</sup> 5014	21 3 0	232 14	5 19	0 <sup>.</sup> 4059
21	16 42 7	17 50	0 <sup>.</sup> 4909	20 40 1	234 38	5 19	0 <sup>.</sup> 4093
31	16 58 6	18 8	0 <sup>.</sup> 4786	20 16 5	236 59	5 18	0 <sup>.</sup> 4127
Feb. 10	17 13 5	18 18	0 <sup>.</sup> 4647	19 52 0	239 18	5 16	0 <sup>.</sup> 4161
20	17 27 4	18 21	0 <sup>.</sup> 4491	19 26 4	241 34	5 14	0 <sup>.</sup> 4193
Mar. 1	17 40 0	18 17	0 <sup>.</sup> 4319	18 59 5	243 49	5 12	0 <sup>.</sup> 4225
11	17 51 1	18 8	0 <sup>.</sup> 4132	18 31 1	246 2	5 9	0 <sup>.</sup> 4257
21	18 0 4	17 55	0 <sup>.</sup> 3933	18 1 0	248 13	5 6	0 <sup>.</sup> 4288
31	18 7 8	17 40	0 <sup>.</sup> 3724	17 28 9	250 22	5 2	0 <sup>.</sup> 4318
Apr. 10	18 12 9	17 24	0 <sup>.</sup> 3509	16 54 5	252 29	4 58	0 <sup>.</sup> 4347
20	18 15 6	17 8	0 <sup>.</sup> 3294	16 17 6	254 35	4 54	0 <sup>.</sup> 4376
May 30	18 15 7	16 53	0 <sup>.</sup> 3090	15 38 1	256 38	4 49	0 <sup>.</sup> 4404
10	18 13 0	16 41	0 <sup>.</sup> 2906	14 56 0	258 41	4 44	0 <sup>.</sup> 4431
20	18 7 8	16 33	0 <sup>.</sup> 2754	14 11 3	260 42	4 39	0 <sup>.</sup> 4457
30	18 0 3	16 30	0 <sup>.</sup> 2649	13 24 5	262 41	4 33	0 <sup>.</sup> 4483
June 9	17 51 3	16 31	0 <sup>.</sup> 2602	12 36 2	264 39	4 27	0 <sup>.</sup> 4508
19	17 41 6	16 37	0 <sup>.</sup> 2619	11 47 3	266 35	4 21	0 <sup>.</sup> 4531
29	17 32 4	16 47	0 <sup>.</sup> 2701	10 58 8	268 31	4 15	0 <sup>.</sup> 4554
July 9	17 24 4	17 1	0 <sup>.</sup> 2842	10 11 6	270 25	4 8	0 <sup>.</sup> 4577
19	17 18 4	17 18	0 <sup>.</sup> 3029	9 26 4	272 18	4 2	0 <sup>.</sup> 4598
29	17 14 7	17 40	0 <sup>.</sup> 3250	8 43 6	274 9	3 55	0 <sup>.</sup> 4619
Aug. 8	17 13 6	18 4	0 <sup>.</sup> 3492	8 3 2	276 0	3 48	0 <sup>.</sup> 4638
18	17 14 9	18 30	0 <sup>.</sup> 3744	7 25 2	277 50	3 41	0 <sup>.</sup> 4657
28	17 18 5	18 57	0 <sup>.</sup> 3998	6 49 6	279 38	3 33	0 <sup>.</sup> 4675
Sept. 7	17 24 2	19 24	0 <sup>.</sup> 4246	6 16 0	281 26	3 26	0 <sup>.</sup> 4692
17	17 31 7	19 49	0 <sup>.</sup> 4484	5 44 2	283 13	3 18	0 <sup>.</sup> 4709
27	17 40 8	20 12	0 <sup>.</sup> 4709	5 14 0	284 59	3 10	0 <sup>.</sup> 4724
Oct. 7	17 51 3	20 32	0 <sup>.</sup> 4918	4 45 1	286 45	3 2	0 <sup>.</sup> 4739
17	18 3 0	20 47	0 <sup>.</sup> 5112	4 17 4	288 29	2 54	0 <sup>.</sup> 4753
27	18 15 6	20 57	0 <sup>.</sup> 5288	3 50 7	290 13	2 46	0 <sup>.</sup> 4766
Nov. 6	18 29 1	21 2	0 <sup>.</sup> 5445	3 24 9	291 57	2 38	0 <sup>.</sup> 4778
16	18 43 2	21 0	0 <sup>.</sup> 5586	2 59 6	293 40	2 29	0 <sup>.</sup> 4789
26	18 57 8	20 53	0 <sup>.</sup> 5708	2 34 8	295 22	2 21	0 <sup>.</sup> 4799
Dec. 6	19 12 9	20 38	0 <sup>.</sup> 5811	2 10 5	297 4	2 12	0 <sup>.</sup> 4809
16	19 28 3	20 17	0 <sup>.</sup> 5897	1 46 5	298 45	2 4	0 <sup>.</sup> 4817
26	19 43 8	19 49	0 <sup>.</sup> 5964	1 22 6	300 26	1 55	0 <sup>.</sup> 4825
36	19 59 3	S. 19 15	0 <sup>.</sup> 6013	0 58 8	302 7	N. 1 46	0 <sup>.</sup> 4832



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in Hour of Long.	Hor. Par.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
May 9	18 13 8.85	18 12 44.78	0.97	16 41 32.4	16 40 34.3	12.5	4.6
11	18 12 19.16	18 10 53.17	1.10	16 39 38.5	16 38 45.7	12.3	4.6
13	18 11 23.35	18 9 48.41	1.23	16 37 54.0	16 37 5.3	12.1	4.6
15	18 10 21.52	18 8 37.90	1.35	16 36 19.2	16 35 55.5	11.9	4.7
17	18 9 13.86	18 7 21.84	1.47	16 34 54.4	16 34 15.8	11.7	4.7
19	18 8 0.54	18 6 0.51	1.58	16 33 39.7	16 33 6.3	11.5	4.7
21	18 6 41.82	18 4 34.19	1.69	16 32 35.5	16 31 18.9	11.3	4.8
23	18 5 17.95	18 3 3.21	1.80	16 31 41.8	16 30 41.1	11.0	4.8
25	18 3 49.26	18 1 27.93	1.90	16 30 58.6	16 30 14.2	10.8	4.8
27	18 2 16.09	17 59 48.69	1.99	16 30 26.3	16 29 57.9	10.6	4.8
29	18 0 38.78	17 58 5.92	2.07	16 30 4.7	16 29 52.5	10.3	4.8
31	17 58 57.73		2.14	16 29 53.9		10.1	4.9
June 2	17 57 13.32	17 56 19.97	2.21	16 29 53.9	16 29 58.0	0.1	4.9
4	17 55 25.94	17 54 31.27	2.26	16 30 4.7	16 30 14.1	0.3	4.9
6	17 53 36.02	17 52 40.24	2.31	16 30 26.2	16 30 40.9	0.6	4.9
8	17 51 43.99	17 50 47.32	2.35	16 30 58.3	16 31 18.3	0.8	4.9
10	17 49 50.29	17 48 52.95	2.38	16 31 41.0	16 32 6.3	1.0	4.9
12	17 47 55.37	17 46 57.60	2.40	16 32 34.2	16 33 4.7	1.2	4.9
14	17 45 59.72	17 45 1.77	2.41	16 33 37.8	16 34 13.4	1.4	4.9
16	17 44 3.81	17 43 5.91	2.41	16 34 51.7	16 35 32.5	1.6	4.9
18	17 42 8.14	17 41 10.55	2.40	16 36 15.9	16 37 1.9	1.8	4.9
20	17 40 13.22	17 39 16.20	2.38	16 37 50.5	16 38 41.6	2.1	4.9
22	17 38 19.55	17 37 23.32	2.35	16 39 35.2	16 40 31.4	2.3	4.9
24	17 36 27.61	17 35 32.45	2.31	16 41 30.2	16 42 31.5	2.5	4.9
26	17 34 37.90	17 33 44.00	2.26	16 43 35.3	16 44 41.6	2.7	4.8
28	17 32 50.81	17 31 58.38	2.20	16 45 50.4	16 47 1.6	2.9	4.8
30	17 31 6.75	17 30 15.97	2.13	16 48 15.4	16 49 31.6	3.1	4.8
July 2	17 29 26.09	17 28 37.15	2.06	16 50 50.2	16 52 11.2	3.3	4.8
4	17 27 49.18	17 27 2.23	1.98	16 53 34.7	16 55 0.5	3.5	4.7
6	17 26 16.34	17 25 31.53	1.89	16 56 28.7	16 57 59.3	3.7	4.7
8	17 24 47.86	17 24 5.34	1.80	16 59 32.2	17 1 7.5	3.9	4.7
10	17 23 24.01	17 22 43.91	1.70	17 2 45.0	17 4 24.9	4.1	4.7
12	17 22 5.06	17 21 27.48	1.59	17 6 7.0	17 7 51.5	4.3	4.6
14	17 20 51.22	17 20 16.29	1.48	17 9 38.1	17 11 27.0	4.5	4.6
16	17 19 42.71	17 19 10.50	1.37	17 13 18.0	17 15 11.3	4.6	4.5
18	17 18 39.71	17 18 10.33	1.25	17 17 6.7	17 19 4.2	4.8	4.5
20	17 17 42.40	17 17 15.92	1.14	17 21 3.7	17 23 5.3	5.0	4.4
22	17 16 50.90	17 16 27.37	1.01	17 25 8.9	17 27 14.6	5.2	4.4
24	17 16 5.34	17 15 44.80	0.89	17 29 22.1	17 31 31.5	5.4	4.4
26	17 15 25.76	17 15 8.23	0.76	17 33 42.8	17 35 55.9	5.5	4.3
28	17 14 52.21	17 14 37.70	0.64	17 38 10.9	17 40 27.5	5.7	4.3
30	17 14 24.69	17 14 13.19	0.51	17 42 45.8	17 45 5.7	5.8	4.2



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	—	—
Aug. 1	17 14 3 <sup>19</sup>	17 13 54 <sup>69</sup>	0 <sup>39</sup>	17 47 27 <sup>3</sup>	17 49 50 <sup>4</sup>	5 <sup>9</sup>	4 <sup>2</sup>
3	17 13 47 <sup>69</sup>	17 13 42 <sup>18</sup>	0 <sup>26</sup>	17 52 14 <sup>9</sup>	17 54 40 <sup>9</sup>	6 <sup>1</sup>	4 <sup>1</sup>
5	17 13 38 <sup>16</sup>	17 13 35 <sup>62</sup>	0 <sup>14</sup>	17 57 8 <sup>1</sup>	17 59 36 <sup>7</sup>	6 <sup>2</sup>	4 <sup>1</sup>
7	17 13 34 <sup>56</sup>	17 13 34 <sup>96</sup>	0 <sup>01</sup>	18 2 6 <sup>5</sup>	18 4 37 <sup>5</sup>	6 <sup>3</sup>	4 <sup>0</sup>
			+				
9	17 13 36 <sup>83</sup>	17 13 40 <sup>16</sup>	0 <sup>11</sup>	18 7 9 <sup>7</sup>	18 9 42 <sup>9</sup>	6 <sup>4</sup>	4 <sup>0</sup>
11	17 13 44 <sup>93</sup>	17 13 51 <sup>14</sup>	0 <sup>23</sup>	18 12 17 <sup>2</sup>	18 14 52 <sup>4</sup>	6 <sup>5</sup>	4 <sup>0</sup>
13	17 13 58 <sup>79</sup>	17 14 7 <sup>87</sup>	0 <sup>35</sup>	18 17 28 <sup>4</sup>	18 20 5 <sup>4</sup>	6 <sup>5</sup>	3 <sup>9</sup>
15	17 14 18 <sup>36</sup>	17 14 30 <sup>26</sup>	0 <sup>47</sup>	18 22 43 <sup>1</sup>	18 25 21 <sup>5</sup>	6 <sup>6</sup>	3 <sup>9</sup>
17	17 14 43 <sup>57</sup>	17 14 58 <sup>27</sup>	0 <sup>58</sup>	18 28 0 <sup>6</sup>	18 30 40 <sup>3</sup>	6 <sup>6</sup>	3 <sup>9</sup>
19	17 15 14 <sup>34</sup>	17 15 31 <sup>78</sup>	0 <sup>70</sup>	18 33 20 <sup>6</sup>	18 36 1 <sup>3</sup>	6 <sup>7</sup>	3 <sup>8</sup>
21	17 15 50 <sup>57</sup>	17 16 10 <sup>70</sup>	0 <sup>81</sup>	18 38 42 <sup>4</sup>	18 41 23 <sup>8</sup>	6 <sup>7</sup>	3 <sup>8</sup>
23	17 16 32 <sup>14</sup>	17 16 54 <sup>89</sup>	0 <sup>92</sup>	18 44 5 <sup>5</sup>	18 46 47 <sup>4</sup>	6 <sup>7</sup>	3 <sup>7</sup>
25	17 17 18 <sup>93</sup>	17 17 44 <sup>25</sup>	1 <sup>03</sup>	18 49 29 <sup>4</sup>	18 52 11 <sup>5</sup>	6 <sup>8</sup>	3 <sup>7</sup>
27	17 18 10 <sup>84</sup>	17 18 38 <sup>67</sup>	1 <sup>13</sup>	18 54 53 <sup>5</sup>	18 57 35 <sup>5</sup>	6 <sup>8</sup>	3 <sup>6</sup>
29	17 19 7 <sup>73</sup>	17 19 38 <sup>00</sup>	1 <sup>24</sup>	19 0 17 <sup>2</sup>	19 2 58 <sup>8</sup>	6 <sup>7</sup>	3 <sup>6</sup>
31	17 20 9 <sup>48</sup>	17 20 42 <sup>13</sup>	1 <sup>34</sup>	19 5 40 <sup>1</sup>	19 8 21 <sup>0</sup>	6 <sup>7</sup>	3 <sup>6</sup>
Sept. 2	17 21 15 <sup>96</sup>	17 21 50 <sup>94</sup>	1 <sup>43</sup>	19 11 1 <sup>5</sup>	19 13 41 <sup>5</sup>	6 <sup>7</sup>	3 <sup>5</sup>
4	17 22 27 <sup>05</sup>	17 23 4 <sup>30</sup>	1 <sup>53</sup>	19 16 20 <sup>9</sup>	19 18 59 <sup>7</sup>	6 <sup>6</sup>	3 <sup>5</sup>
6	17 23 42 <sup>65</sup>	17 24 22 <sup>10</sup>	1 <sup>62</sup>	19 21 37 <sup>8</sup>	19 24 15 <sup>2</sup>	6 <sup>6</sup>	3 <sup>4</sup>
8	17 25 2 <sup>64</sup>	17 25 44 <sup>24</sup>	1 <sup>71</sup>	19 26 51 <sup>7</sup>	19 29 27 <sup>4</sup>	6 <sup>5</sup>	3 <sup>4</sup>
10	17 26 26 <sup>92</sup>	17 27 10 <sup>63</sup>	1 <sup>80</sup>	19 32 2 <sup>1</sup>	19 34 35 <sup>8</sup>	6 <sup>4</sup>	3 <sup>4</sup>
12	17 27 55 <sup>38</sup>		1 <sup>89</sup>	19 37 8 <sup>4</sup>		6 <sup>3</sup>	3 <sup>3</sup>



## MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. Vect.
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 19 53.1	S. 19 29	0.5996	h m 1 8.3	° ' 301 27	N. 1 50	0.4829
11	20 8.7	18 52	0.6034	0 44.5	303 7	1 41	0.4836
21	20 24.1	18 9	0.6055	0 20.6	304 47	1 32	0.4841
31	20 39.5	17 20	0.6058	23 54.1	306 27	1 23	0.4846
Feb. 10	20 54.6	16 27	0.6043	23 29.8	308 6	1 14	0.4850
20	21 9.4	15 31	0.6011	23 5.2	309 46	1 5	0.4853
Mar. 2	21 23.9	14 31	0.5960	22 40.2	311 25	0 56	0.4856
12	21 37.9	13 30	0.5893	22 14.9	313 4	0 47	0.4857
22	21 51.6	12 27	0.5808	21 49.1	314 44	0 38	0.4858
Apr. 1	22 4.6	11 24	0.5705	21 22.7	316 23	0 28	0.4857
11	22 17.1	10 22	0.5585	20 55.8	318 2	0 19	0.4856
21	22 29.0	9 22	0.5448	20 28.2	319 41	0 10	0.4854
May 1	22 40.1	8 25	0.5294	19 59.9	321 21	N. 0 1	0.4851
11	22 50.4	7 32	0.5124	19 30.8	323 0	S. 0 9	0.4848
21	22 59.8	6 45	0.4936	19 0.7	324 40	0 18	0.4843
31	23 8.0	6 5	0.4734	18 29.5	326 20	0 27	0.4838
June 10	23 15.0	5 33	0.4519	17 57.0	328 0	0 36	0.4832
20	23 20.6	5 11	0.4293	17 23.1	329 40	0 46	0.4825
30	23 24.5	5 1	0.4061	16 47.6	331 21	0 55	0.4817
July 10	23 26.6	5 4	0.3827	16 10.2	333 3	1 4	0.4808
20	23 26.6	5 22	0.3597	15 30.8	334 44	1 13	0.4799
30	23 24.6	5 54	0.3389	14 49.3	336 26	1 23	0.4788
Aug. 9	23 20.4	6 40	0.3207	14 5.7	338 9	1 32	0.4777
19	23 14.3	7 37	0.3066	13 20.2	339 52	1 41	0.4765
29	23 6.8	8 42	0.2978	12 33.4	341 36	1 50	0.4752
Sept. 8	22 58.5	9 48	0.2951	11 45.9	343 21	1 59	0.4738
18	22 50.4	10 51	0.2987	10 58.5	345 6	2 8	0.4723
28	22 43.2	11 43	0.3082	10 12.0	346 52	2 17	0.4708
Oct. 8	22 37.6	12 21	0.3227	9 27.2	348 39	2 26	0.4692
18	22 34.1	12 45	0.3407	8 44.6	350 26	2 35	0.4675
28	22 33.0	12 52	0.3611	8 4.2	352 15	2 44	0.4656
Nov. 7	22 34.2	12 45	0.3828	7 26.1	354 5	2 52	0.4638
17	22 37.6	12 23	0.4046	6 50.3	355 55	3 1	0.4618
27	22 42.9	11 50	0.4260	6 16.3	357 47	3 9	0.4597
Dec. 7	22 50.0	11 5	0.4468	5 44.1	359 39	3 18	0.4576
17	22 58.6	10 12	0.4656	5 13.4	1 33	3 26	0.4554
27	23 8.5	9 8	0.4831	4 43.9	3 28	S. 3 34	0.4530
37	23 19.4	S. 7 58	0.4991	4 15.4	5 25	3 42	0.4507



AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascension on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Declin. in 1 Hour of Long.	Hor. Par.
	h m s	h m s	—	South.	South.	—	"
July 27	23 25 13.92	23 24 57.55	0.66	5 44 34.3	5 48 13.0	8.9	4.1
29	23 24 39.91	23 24 20.99	0.76	5 52 0.3	5 55 55.9	9.6	4.1
31	23 24 0.81	23 23 39.36	0.87	5 59 59.9	6 4 12.1	10.3	4.1
Aug. 2	23 23 16.66	23 22 52.71	0.97	6 8 32.5	6 13 1.0	11.0	4.2
4	23 22 27.53	23 22 1.12	1.07	6 17 37.4	6 22 21.6	11.7	4.2
6	23 21 33.49	23 21 4.68	1.17	6 27 13.4	6 32 12.6	12.3	4.2
8	23 20 34.69	23 20 3.55	1.27	6 37 19.1	6 42 32.7	12.9	4.3
10	23 19 31.29	23 18 57.92	1.37	6 47 53.2	6 53 20.2	13.5	4.3
12	23 18 23.46	23 17 47.96	1.46	6 58 53.7	7 4 33.3	14.0	4.3
14	23 17 11.43	23 16 33.91	1.54	7 10 18.7	7 16 9.9	14.5	4.4
16	23 15 55.41	23 15 15.98	1.62	7 22 6.4	7 28 8.0	15.0	4.4
18	23 14 35.64	23 13 54.43	1.70	7 34 14.4	7 40 25.4	15.4	4.4
20	23 13 12.39	23 12 29.53	1.77	7 46 40.5	7 52 59.6	15.7	4.4
22	23 11 45.90	23 11 1.54	1.83	7 59 22.4	8 5 48.4	16.0	4.5
24	23 10 16.49	23 9 30.78	1.89	8 12 17.4	8 18 49.1	16.3	4.5
26	23 8 44.46	23 7 57.58	1.94	8 25 23.1	8 31 59.1	16.5	4.5
28	23 7 10.16	23 6 22.27	1.99	8 38 36.6	8 45 15.5	16.6	4.5
30	23 5 33.93	23 4 45.21	2.03	8 51 55.2	8 58 35.5	16.7	4.5
Sept. 1	23 3 56.15	23 3 6.81	2.05	9 5 15.9	9 11 56.1	16.7	4.5
3	23 2 17.23	23 1 27.47	2.07	9 18 35.6	9 25 14.2	16.6	4.5
5	23 0 37.57	22 59 47.61	2.08	9 31 51.4	9 38 26.8	16.5	4.5
7	22 58 57.62	22 58 7.68	2.07	9 45 0.1	9 51 30.9	16.3	4.5
9	22 57 17.82	22 56 28.09	2.07	9 57 58.8	10 4 23.4	16.1	4.5
11	22 55 38.58	22 54 49.31	2.06	10 10 44.4	10 17 1.5	15.8	4.5
13	22 54 0.35	22 53 11.74	2.03	10 23 14.2	10 29 22.4	15.4	4.5
15	22 52 23.53	22 51 35.77	2.00	10 35 25.7	10 41 23.8	15.0	4.5
17	22 50 48.51	22 50 1.80	1.96	10 47 16.2	10 53 2.9	14.6	4.5
19	22 49 15.68	22 48 30.20	1.91	10 58 43.5	11 4 17.8	14.1	4.5
21	22 47 45.40	22 47 1.31	1.85	11 9 45.5	11 15 6.4	13.5	4.5
23	22 46 17.99	22 45 35.47	1.79	11 20 20.2	11 25 26.8	12.9	4.5
25	22 44 53.80	22 44 13.01	1.72	11 30 25.9	11 35 17.3	12.3	4.4
27	22 43 33.14	22 42 54.24	1.64	11 40 0.8	11 44 36.3	11.6	4.4
29	22 42 16.33	22 41 39.46	1.56	11 49 3.6	11 53 22.5	11.0	4.4
Oct. 1	22 41 3.65	22 40 28.94	1.47	11 57 32.9	12 1 34.5	10.3	4.4
3	22 39 55.36	22 39 22.94	1.38	12 5 27.4	12 9 11.4	9.5	4.3
5	22 38 51.72	22 38 21.71	1.28	12 12 46.3	12 16 12.1	8.8	4.3
7	22 37 52.94	22 37 25.44	1.17	12 19 28.6	12 22 35.8	8.0	4.3
9	22 36 59.22	22 36 34.31	1.06	12 25 33.7	12 28 22.2	7.2	4.2
11	22 36 10.72	22 35 48.48	0.96	12 31 1.2	12 33 30.7	6.4	4.2
13	22 35 27.58	22 35 8.04	0.85	12 35 50.7	12 38 1.2	5.6	4.2
15	22 34 49.88	22 34 33.09	0.73	12 40 2.2	12 41 53.8	4.8	4.1
17	22 34 17.69	22 34 3.67	0.61	12 43 35.9	12 45 8.5	4.1	4.1



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R.A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>s</i>	<i>South.</i> <i>° ' "</i>	<i>South.</i> <i>° ' "</i>	<i>"</i>	<i>"</i>
Oct. 19	22 33 51.05	22 33 39.82	0.49	12 46 31.8	12 47 45.7	3.3	4.1
21	22 33 29.99	22 33 21.55	0.38	12 48 50.2	12 49 45.5	2.5	4.0
23	22 33 14.51	22 33 8.86	0.26	12 50 31.5	12 51 8.4	1.7	4.0
25	22 33 4.62	22 33 1.76	0.15	12 51 36.1	12 51 54.7	1.0	3.9
27	22 33 0.31	22 33 0.24	0.03	12 52 4.3	12 52 4.9	0.2	3.9
			+			+	
29	22 33 1.57	22 33 4.28	0.08	12 51 56.5	12 51 39.2	0.5	3.9
31	22 33 8.38	22 33 13.86	0.20	12 51 13.1	12 50 38.3	1.2	3.8
Nov. 2	22 33 20.71	22 33 28.93	0.31	12 49 54.7	12 49 2.5	2.0	3.8
4	22 33 38.51	22 33 49.44	0.43	12 48 1.7	12 46 52.5	2.7	3.8
6	22 34 1.70	22 34 15.30	0.54	12 45 34.9	12 44 8.9	3.4	3.7
8	22 34 30.21	22 34 46.42	0.65	12 42 34.7	12 40 52.4	4.1	3.7
10	22 35 3.92	22 35 22.69	0.76	12 39 2.0	12 37 3.7	4.8	3.7
12	22 35 42.74	22 36 4.03	0.86	12 34 57.5	12 32 43.5	5.5	3.6
14	22 36 26.54	22 36 50.28	0.96	12 30 21.9	12 27 52.6	6.1	3.6
16	22 37 15.22	22 37 41.34	1.06	12 25 15.9	12 22 31.7	6.7	3.6
18	22 38 8.64	22 38 37.09	1.16	12 19 40.3	12 16 41.6	7.3	3.5
20	22 39 6.69	22 39 37.42	1.26	12 13 35.7	12 10 22.8	7.9	3.5
22	22 40 9.26	22 40 42.21	1.35	12 7 2.8	12 3 36.0	8.5	3.5
24	22 41 16.24	22 41 51.35	1.44	12 0 2.3	11 56 21.9	9.0	3.4
26	22 42 27.51	22 43 4.73	1.53	11 52 34.8	11 48 41.0	9.6	3.4
28	22 43 42.98	22 44 22.25	1.62	11 44 40.8	11 40 34.1	10.1	3.4
30	22 45 2.53	22 45 43.81	1.70	11 36 21.0	11 32 1.7	10.7	3.3
Dec. 2	22 46 26.06		1.78	11 27 36.0		11.2	3.3



MEAN TIME.

Month and Day.	Geocentric.				Heliocentric.		
	Right Ascension.	Declination.	Log. of Dist. from the Earth.	Meridian Passage.	Longitude.	Latitude.	Log. of Rad. (Vect.)
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.
Jan. 1	h m 23 13.8	S. 8 34	0.4913	h m 4 29.5	° ' / 4 27	S. 3 38	0.4519
11	23 25.2	7 21	0.5063	4 1.6	6 24	3 46	0.4494
21	23 37.4	6 1	0.5196	3 34.5	8 22	3 53	0.4469
31	23 50.4	4 37	0.5310	3 8.0	10 22	4 1	0.4443
Feb. 10	0 3.9	3 10	0.5407	2 42.2	12 23	4 8	0.4417
20	0 18.0	1 39	0.5486	2 16.9	14 26	4 15	0.4389
Mar. 2	0 32.5	S. 0 6	0.5548	1 52.0	16 31	4 22	0.4361
12	0 47.4	N. 1 28	0.5592	1 27.6	18 37	4 28	0.4332
22	1 2.7	3 2	0.5619	1 3.5	20 45	4 34	0.4302
Apr. 1	1 18.4	4 36	0.5631	0 39.7	22 55	4 40	0.4271
11	1 34.3	6 8	0.5627	0 16.3	25 6	4 46	0.4240
21	1 50.6	7 37	0.5607	23 50.9	27 20	4 51	0.4208
May 1	2 7.1	9 4	0.5572	23 28.0	29 36	4 56	0.4176
11	2 23.9	10 27	0.5521	23 5.5	31 54	5 1	0.4143
21	2 40.9	11 45	0.5455	22 43.1	34 14	5 5	0.4109
31	2 58.2	12 57	0.5374	22 21.0	36 36	5 8	0.4075
June 10	3 15.6	14 4	0.5278	21 59.1	39 0	5 11	0.4040
20	3 33.2	15 4	0.5167	21 37.3	41 27	5 14	0.4005
30	3 50.9	15 56	0.5041	21 15.6	43 57	5 16	0.3970
July 10	4 8.6	16 40	0.4899	20 53.9	46 29	5 18	0.3935
20	4 26.2	17 16	0.4741	20 32.1	49 3	5 19	0.3899
30	4 43.7	17 44	0.4567	20 10.1	51 40	5 19	0.3862
Aug. 9	5 0.9	18 3	0.4376	19 47.9	54 19	5 19	0.3826
19	5 17.6	18 14	0.4168	19 25.3	57 2	5 18	0.3790
29	5 33.8	18 16	0.3942	19 2.0	59 47	5 16	0.3754
Sept. 8	5 49.2	18 11	0.3698	18 37.9	62 34	5 13	0.3718
18	6 3.6	17 59	0.3436	18 12.9	65 25	5 10	0.3682
28	6 16.8	17 42	0.3156	17 46.6	68 18	5 5	0.3647
Oct. 8	6 28.4	17 20	0.2861	17 18.7	71 14	5 0	0.3612
18	6 38.2	16 56	0.2551	16 48.9	74 13	4 54	0.3578
28	6 45.6	16 32	0.2231	16 16.8	77 14	4 47	0.3545
Nov. 7	6 50.4	16 10	0.1908	15 42.1	80 19	4 40	0.3512
17	6 52.1	15 54	0.1593	15 4.3	83 26	4 31	0.3480
27	6 50.5	15 46	0.1301	14 27.2	86 35	4 21	0.3450
Dec. 7	6 45.7	15 48	0.1051	13 38.9	89 47	4 10	0.3421
17	6 38.0	16 1	0.0865	12 51.8	93 2	3 59	0.3393
27	6 28.5	16 24	0.0762	12 3.0	96 19	3 46	0.3367
37	6 18.7	N. 16 55	0.0753	11 13.9	99 38	S. 3 33	0.3342



## AT TRANSIT OVER THE MERIDIAN OF GREENWICH.

Month and Day.	Apparent Right Ascension.	Right Ascen. on intermediate Day.	Var. of R. A. in 1 Hour of Long.	Apparent Declination.	Declination on intermediate Day.	Var. of Decl. in 1 Hour of Long.	Hor. Par.
	<i>h m s</i>	<i>h m s</i>	<i>s</i>	<i>North.</i> <i>° ' "</i>	<i>North.</i> <i>° ' "</i>	<i>"</i>	<i>"</i>
Nov. 18	6 52 3.90	6 52 0.32	0.11	15 52 25.4	15 51 20.3	2.8	6.3
20	6 51 54.73	6 51 47.14	0.27	15 50 20.4	15 49 25.7	2.4	6.3
22	6 51 37.53	6 51 25.89	0.44	15 48 36.5	15 47 52.8	1.9	6.4
24	6 51 12.25	6 50 56.61	0.61	15 47 14.9	15 46 42.7	1.5	6.5
26	6 50 38.98	6 50 19.38	0.78	15 46 16.5	15 45 56.3	1.0	6.6
28	6 49 57.82	6 49 34.32	0.94	15 45 42.1	15 45 34.3	0.5	6.7
						+	
30	6 49 8.91	6 48 41.60	1.10	15 45 32.7	15 45 37.4	0.1	6.8
Dec. 2	6 48 12.41	6 47 41.37	1.25	15 45 48.5	15 46 6.1	0.6	6.8
4	6 47 8.52	6 46 33.87	1.40	15 46 30.2	15 47 0.8	1.1	6.9
6	6 45 57.48	6 45 19.36	1.55	15 47 38.0	15 48 21.8	1.7	7.0
8	6 44 39.57	6 43 58.16	1.69	15 49 12.2	15 50 9.1	2.2	7.0
10	6 43 15.15	6 42 30.61	1.82	15 51 12.7	15 52 22.8	2.8	7.1
12	6 41 44.58	6 40 57.13	1.95	15 53 39.5	15 55 2.7	3.3	7.2
14	6 40 8.30	6 39 18.17	2.06	15 56 32.3	15 58 8.5	3.9	7.2
16	6 38 26.80	6 37 34.25	2.16	15 59 50.9	16 1 39.7	4.4	7.3
18	6 36 40.60	6 35 45.95	2.26	16 3 34.8	16 5 36.1	4.9	7.4
20	6 34 50.37	6 33 53.95	2.34	16 7 43.4	16 9 56.7	5.4	7.4
22	6 32 56.79	6 31 58.96	2.40	16 12 16.0	16 14 41.0	5.9	7.4
24	6 31 0.58	6 30 1.74	2.44	16 17 11.6	16 19 47.8	6.4	7.5
26	6 29 2.52	6 28 3.03	2.47	16 22 29.4	16 25 16.2	6.8	7.5
28	6 27 3.36	6 26 3.62	2.49	16 28 8.2	16 31 5.0	7.3	7.5
30	6 25 3.89	6 24 4.29	2.49	16 34 6.7	16 37 13.0	7.7	7.5
32	6 23 4.91		2.47	16 40 23.8		8.0	7.5



























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